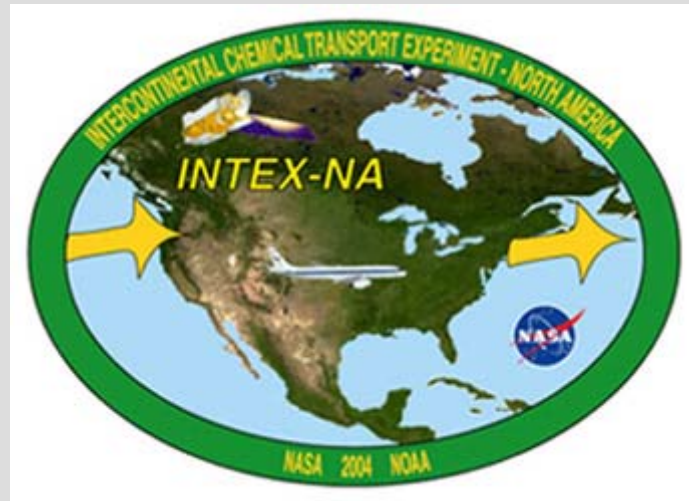


INTEX - NA

Meteorological Overview



Henry Fuelberg
Chris Kiley
Danielle Morse
Michael Porter



Outline

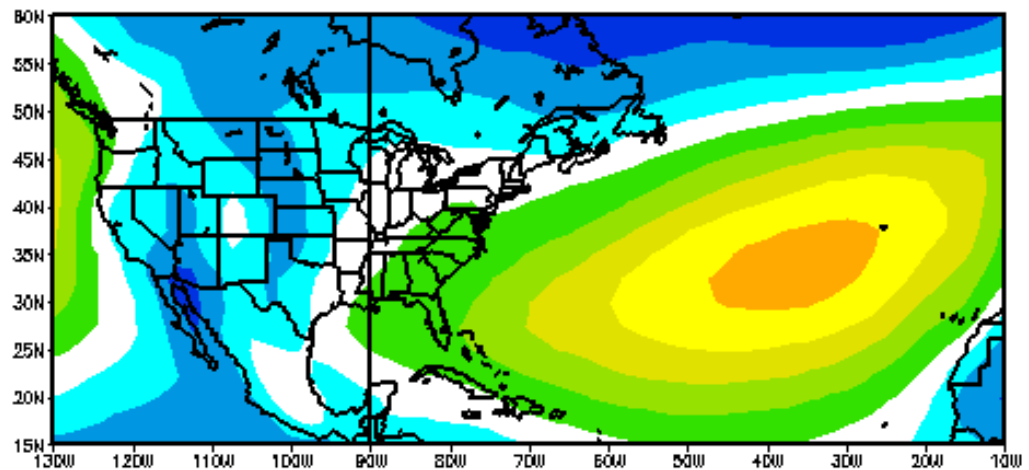
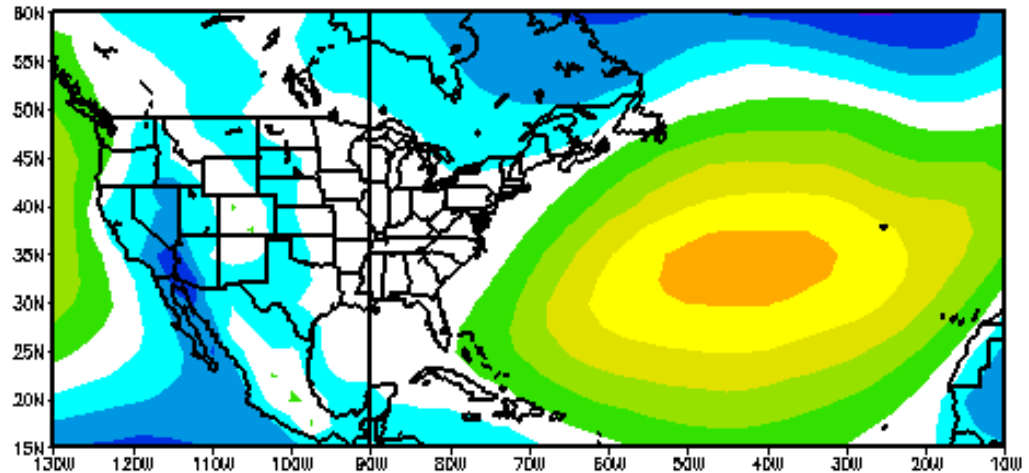
- Describe meteorological conditions during INTEx
- Assess representativeness of INTEx period
- Examine interesting scenarios
 - Extensive lightning
 - Asian pollution
 - Alaskan fires
 - Transport to Europe (Lagrangian experiment)



Surface Pressure

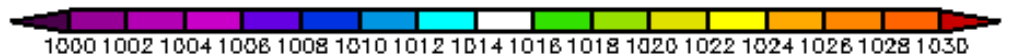
**2004
46-day Mean**

Climatology



SEA LEVEL PRESSURE (mb) 46-DAY LONG TERM MEAN FOR:
JUL 01 - AUG 15

NCEP OPERATIONAL DATASET



Animation of Sea Level Pressure

July 1-6 – California flights

July 7-15 – Mid America I flights

July 16-Aug 11 – Pease flights

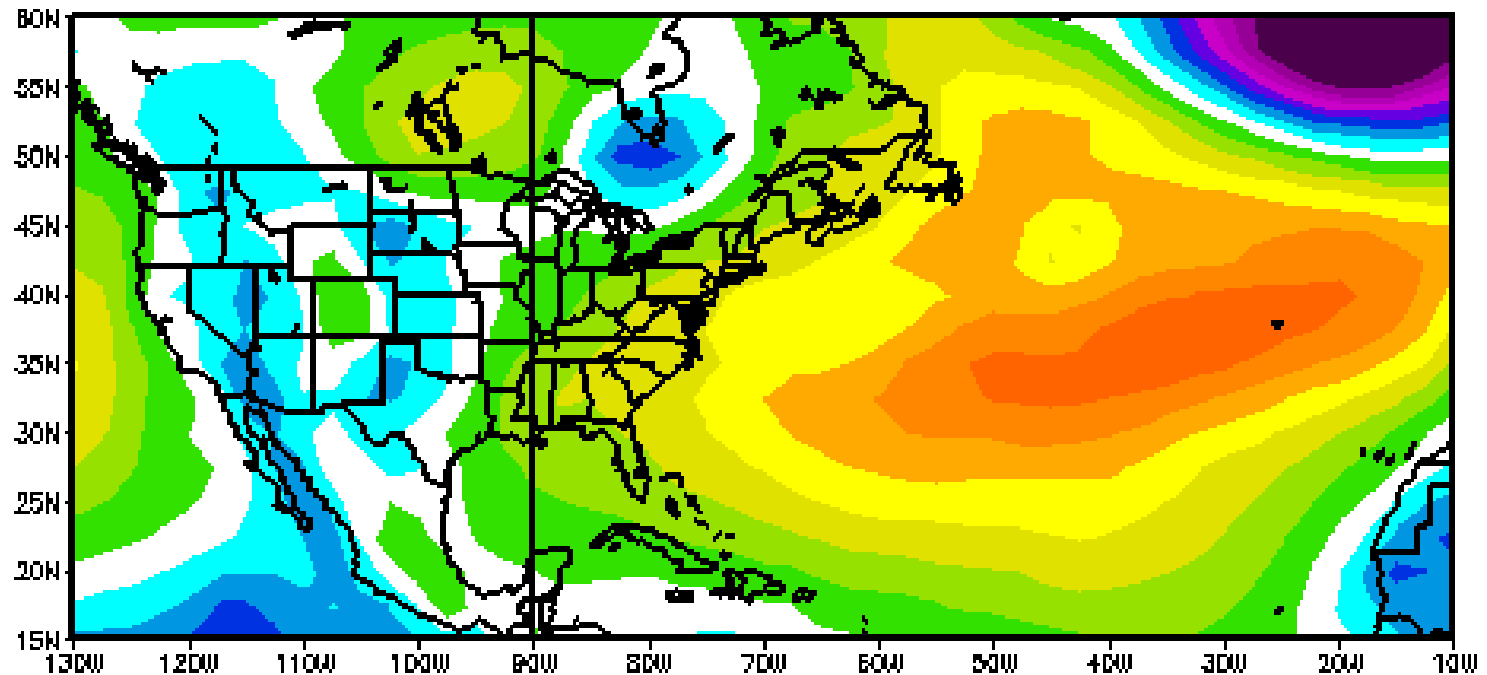
Pause July 28 – North Atlantic flight

Pause July 31 – Bermuda high flight

August 12-15 – Mid America II flights
and return to Dryden



Surface Pressure - CA



SEA LEVEL PRESSURE (mb) 01-DAY MEAN FOR:

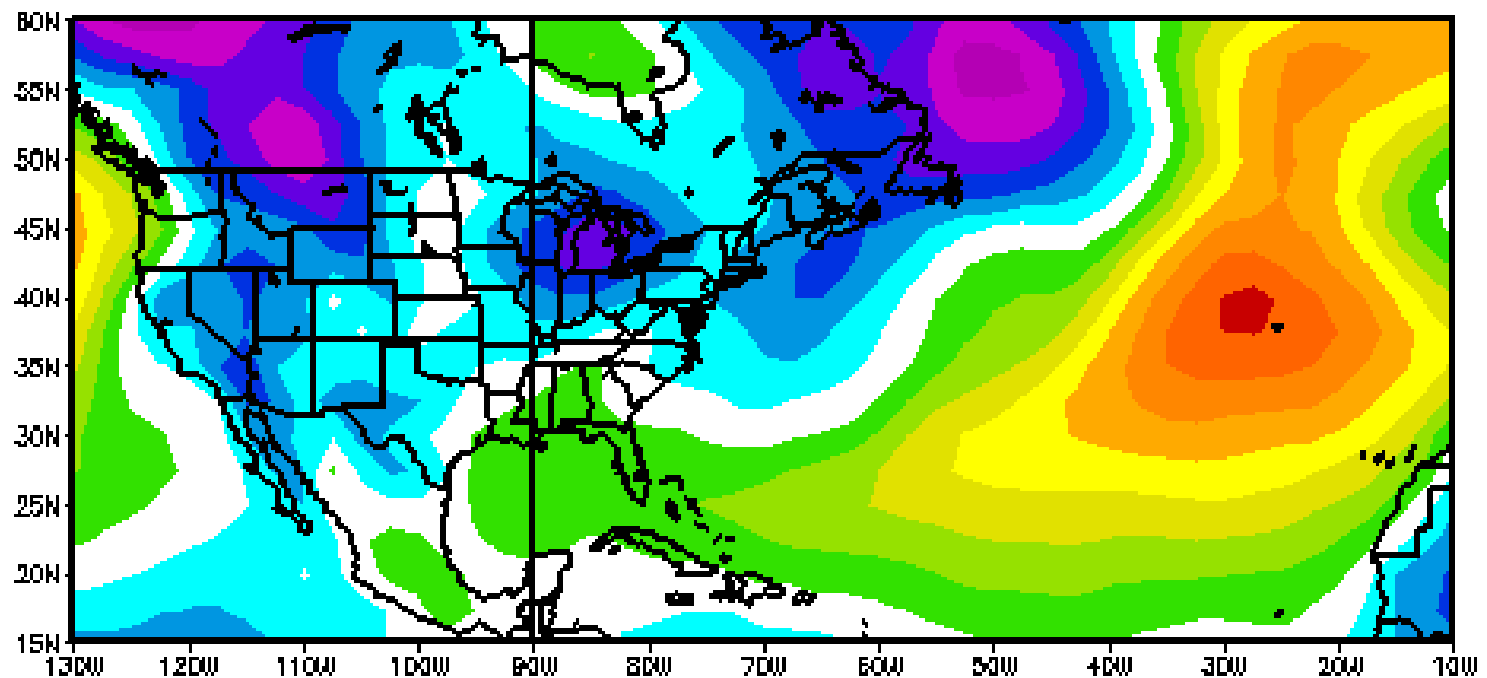
Thu JUL 01 2004

NCEP OPERATIONAL DATASET



Surface Pressure - STL

St Louis



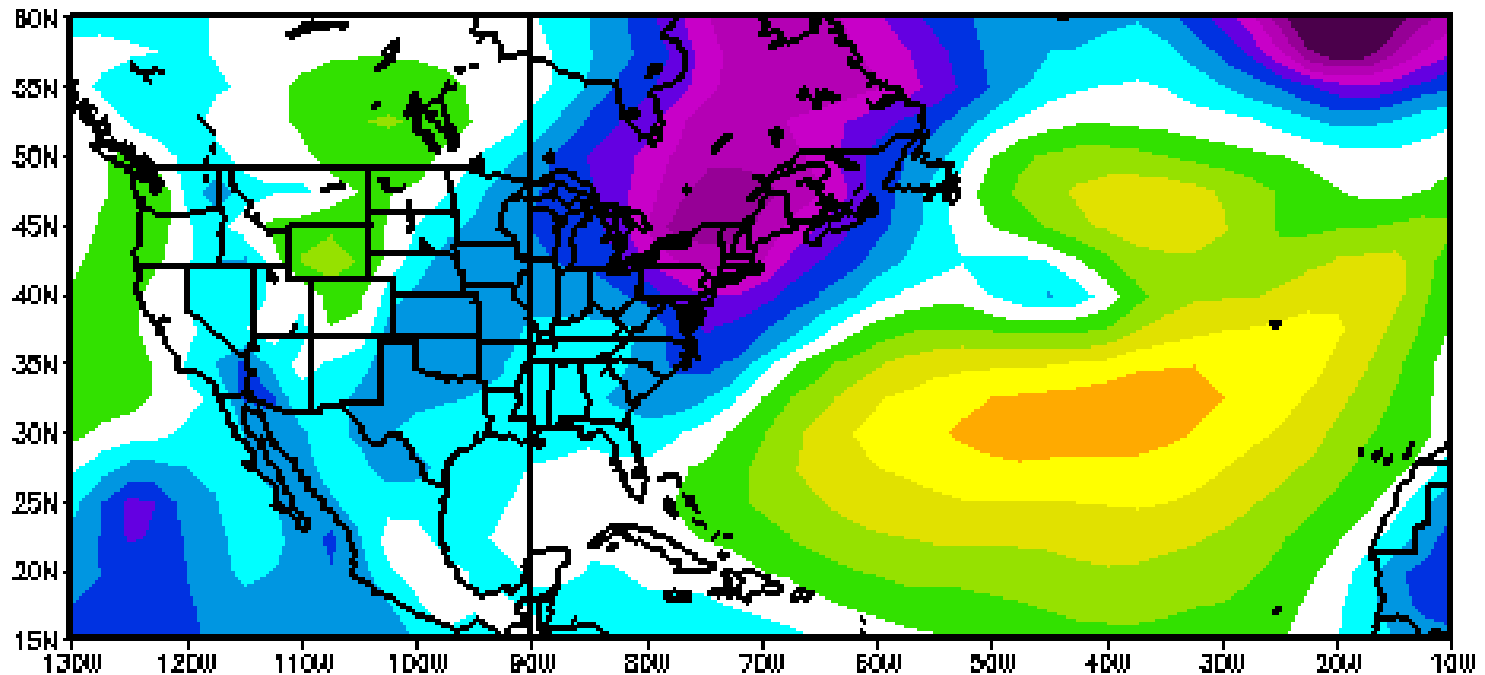
SEA LEVEL PRESSURE (mb) 01-DAY MEAN FOR:
Wed JUL 07 2004

NCEP OPERATIONAL DATASET



Surface Pressure - NH

Pease



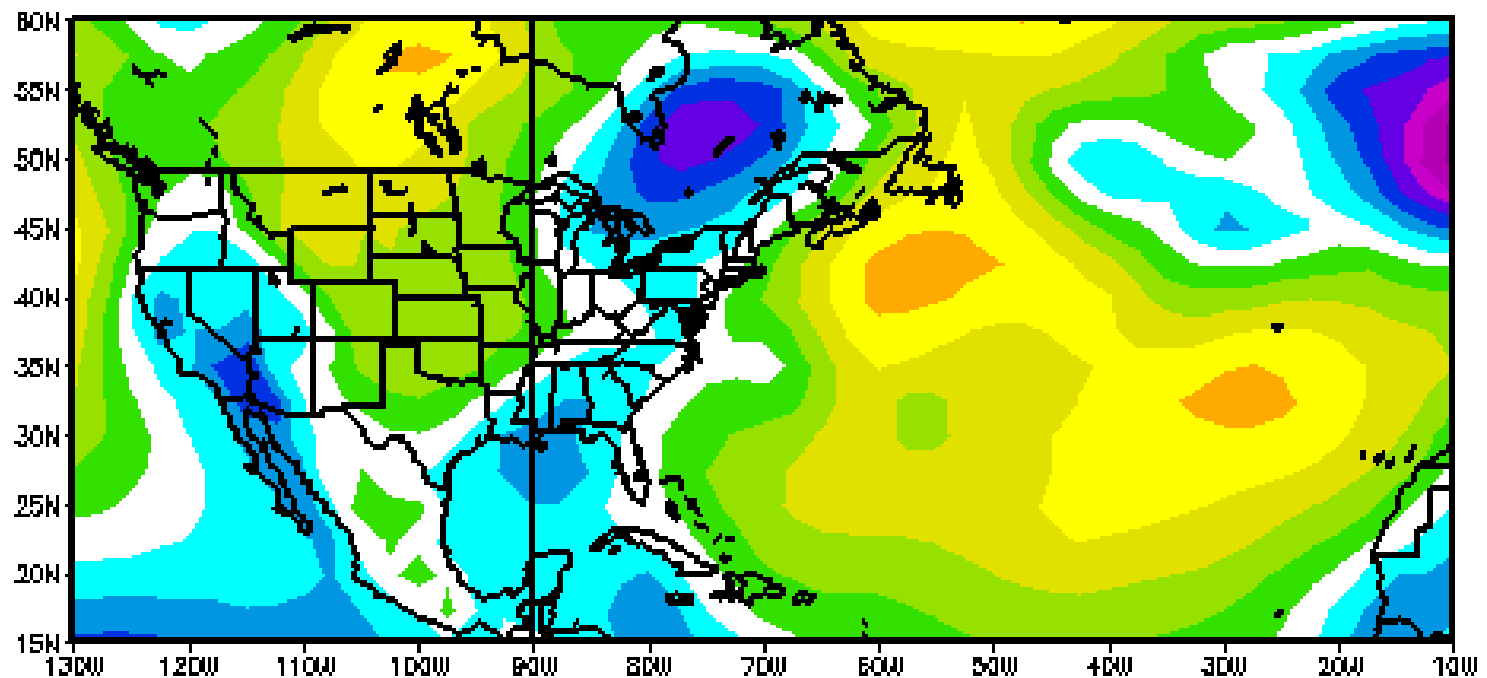
SEA LEVEL PRESSURE (mb) 01-DAY MEAN FOR:
Fri JUL 16 2004

NCEP OPERATIONAL DATASET



Surface Pressure - STL

St Louis



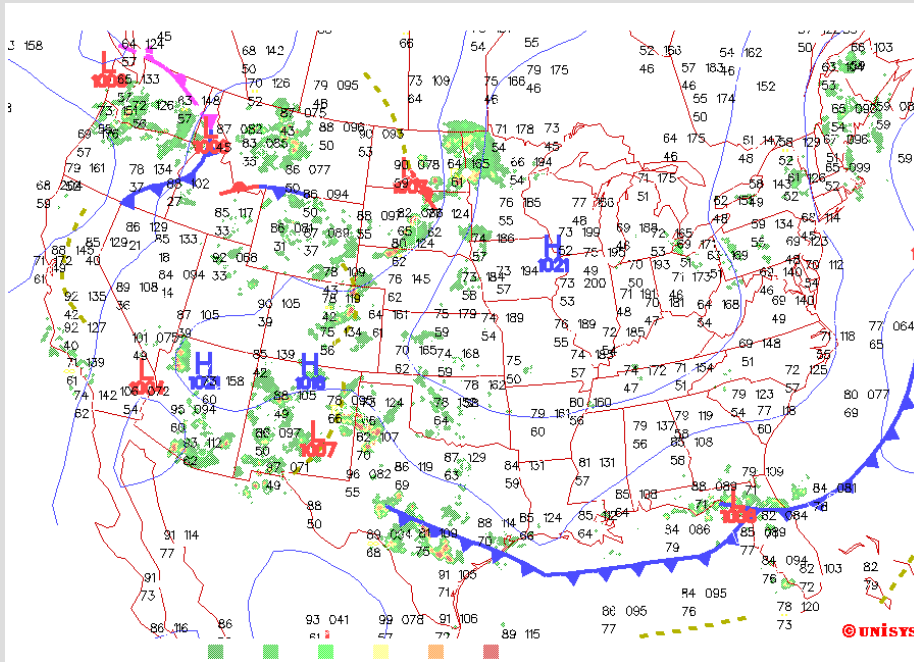
SEA LEVEL PRESSURE (mb) 01-DAY MEAN FOR:

Thu AUG 12 2004

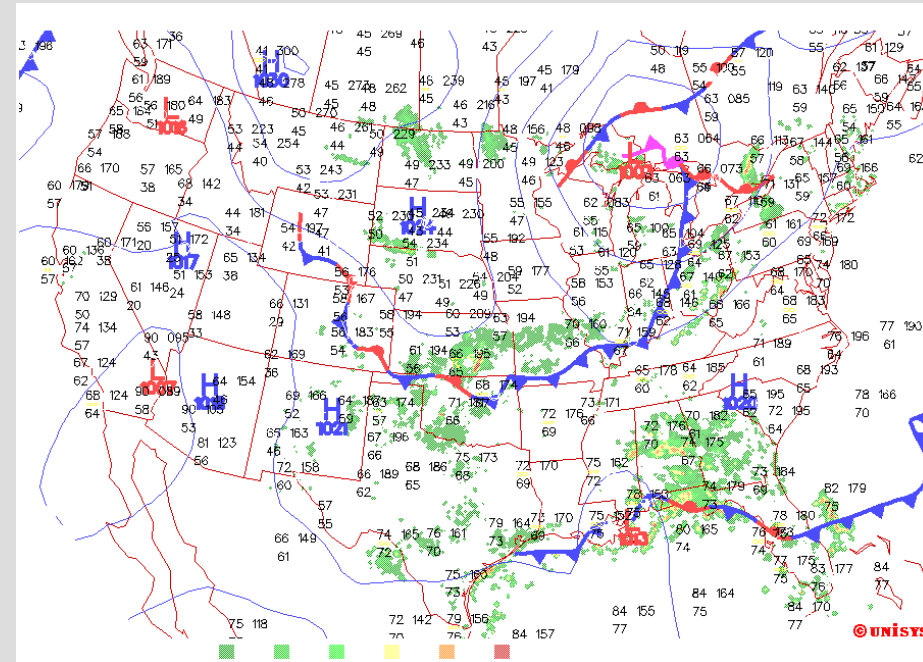
NCEP OPERATIONAL DATASET



Contrasting Weather Patterns



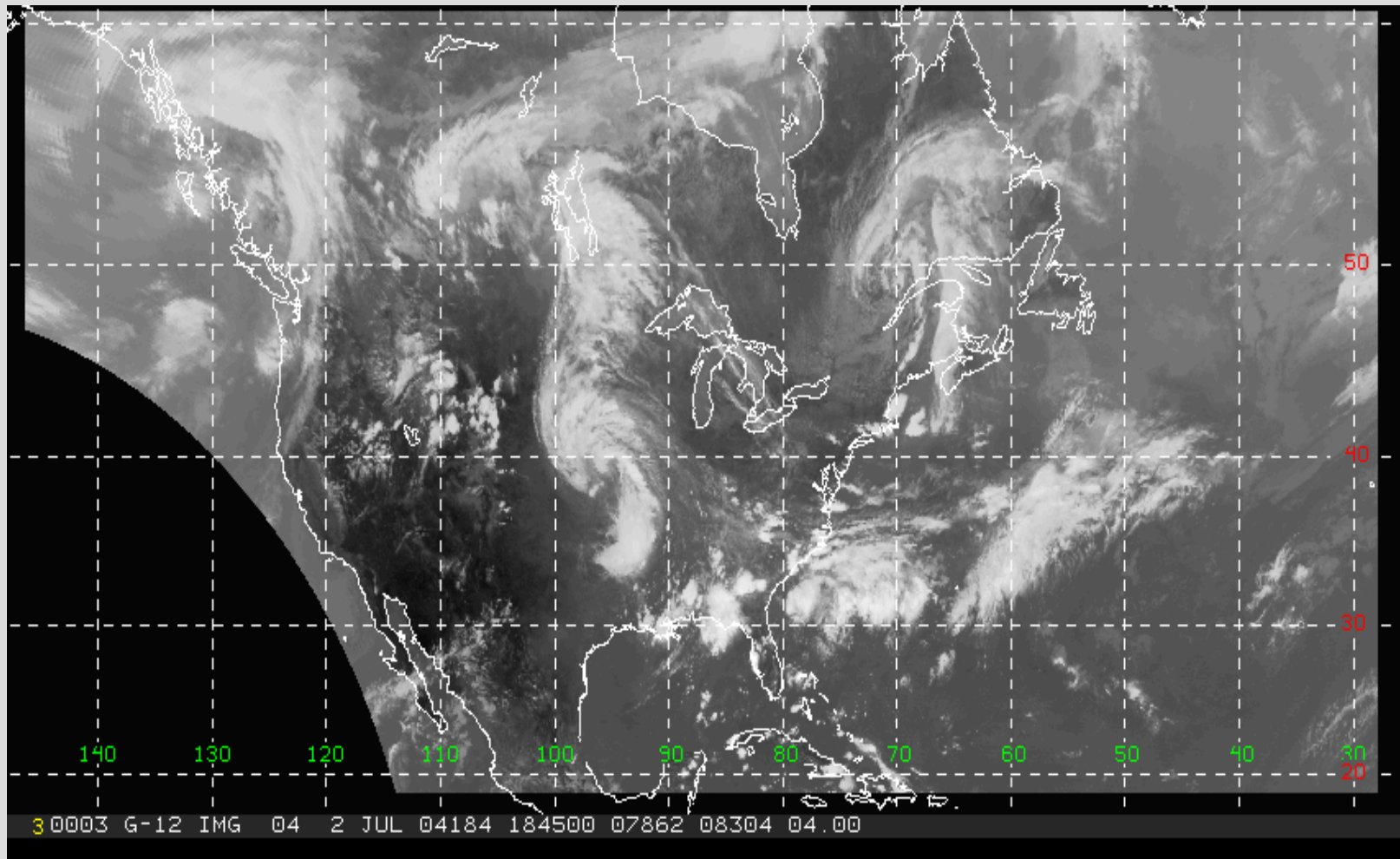
Strongest High – Aug 7 00Z



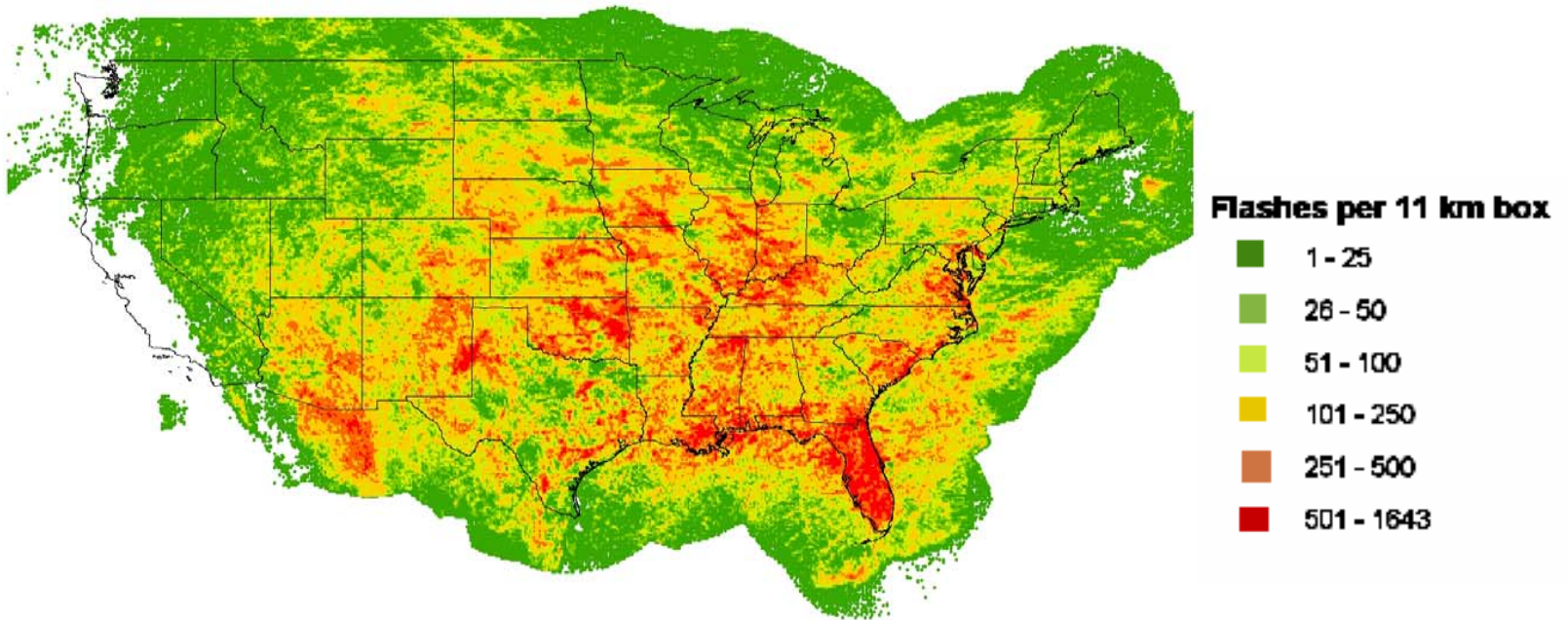
Deepest Low – Aug 10 12Z



GOES-8 IR Imagery



Lightning Composite Entire INTEX Period



Frontal Statistics

A frontal passage can produce much convection, whereas a high pressure area can suppress convection.

July	Number of Fronts Passing NE US	Average Time Between Fronts
2000	3	7 days
2001	4	8 days
2002	6	5.2 days
2003	6	3.8 days
2004	5	5.3 days



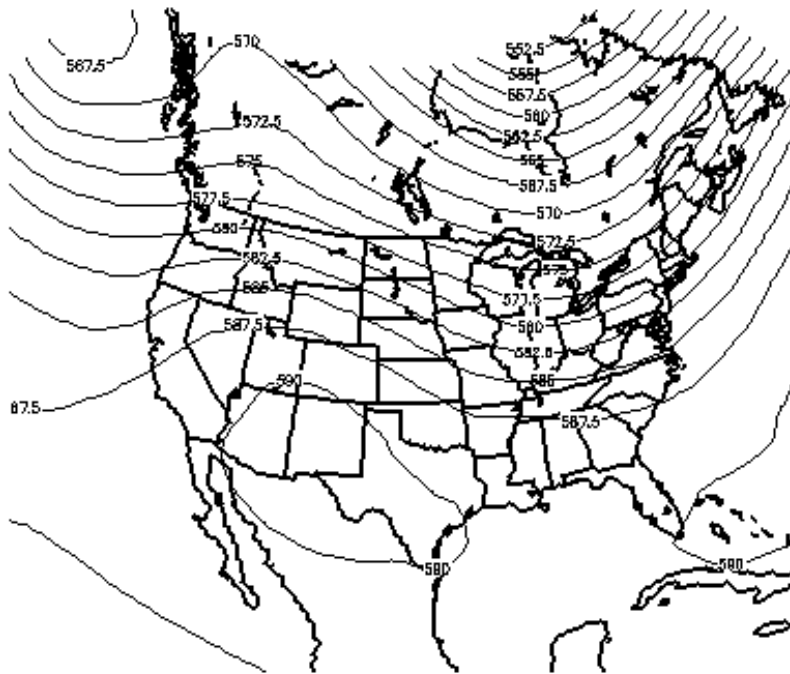
Days With Closed High Affecting Northeast During INTEX Period

- 2000 13 days
- 2001 14 days
- 2002 14 days
- 2003 8 days
- 2004 10 days

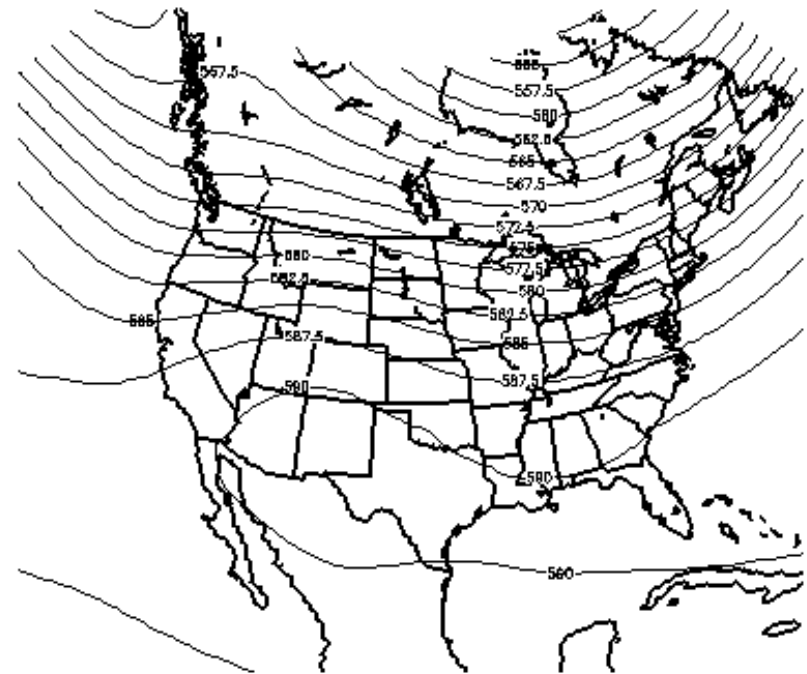
No stagnant highs over northeast !



500 mb Heights



500mb GEOPOTENTIAL HEIGHTS (dam) 46-DAY MEAN FOR:
Thu JUL 01 2004 - Sun AUG 15 2004
NCEP OPERATIONAL DATASET



500mb GEOPOTENTIAL HEIGHTS (dam) 46-DAY LONG TERM MEAN FOR:
JUL 01 - AUG 15
NCEP OPERATIONAL DATASET

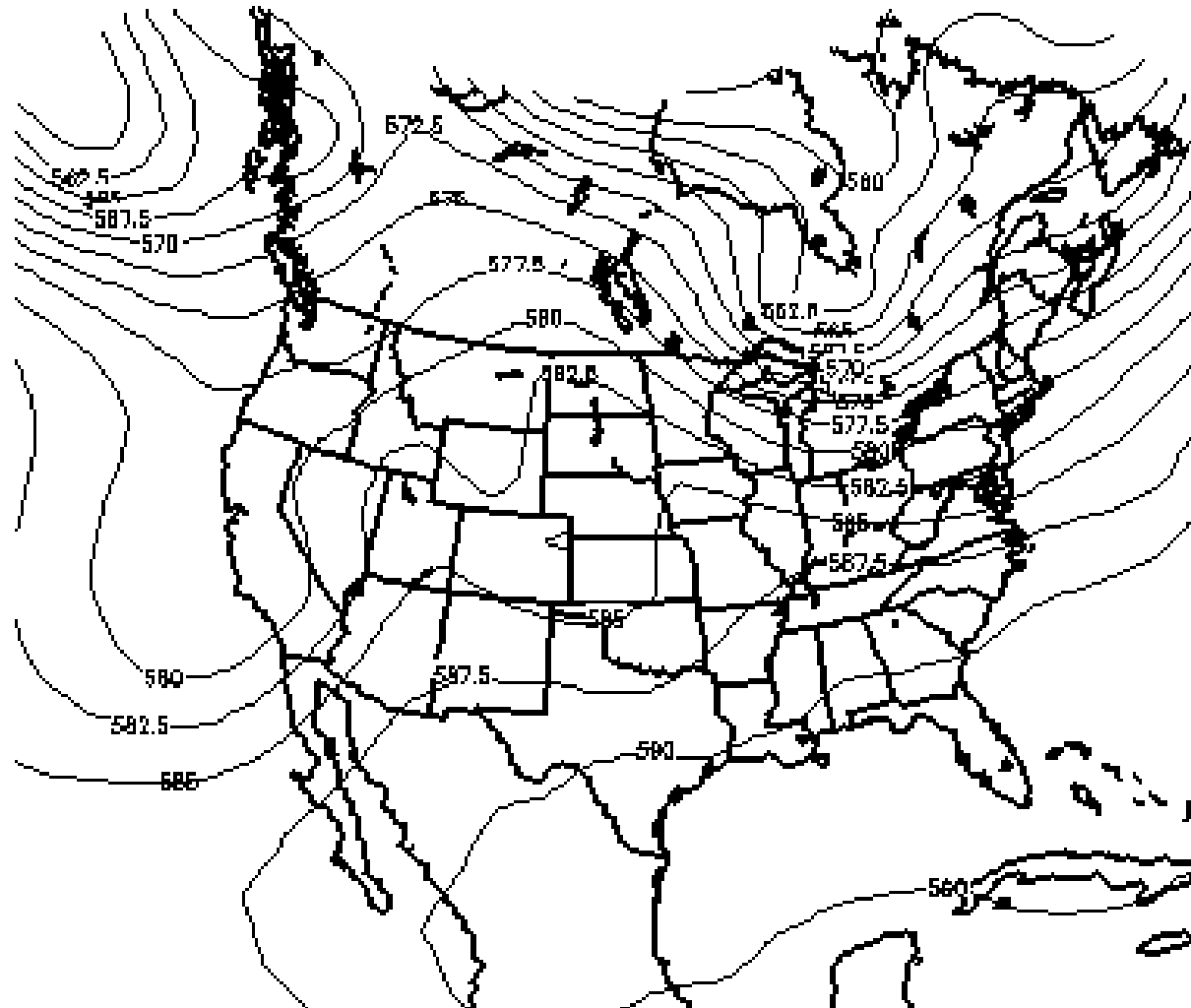
2004
46-day Mean

Climatology



Dept. of Meteorology

500 mb Heights - CA

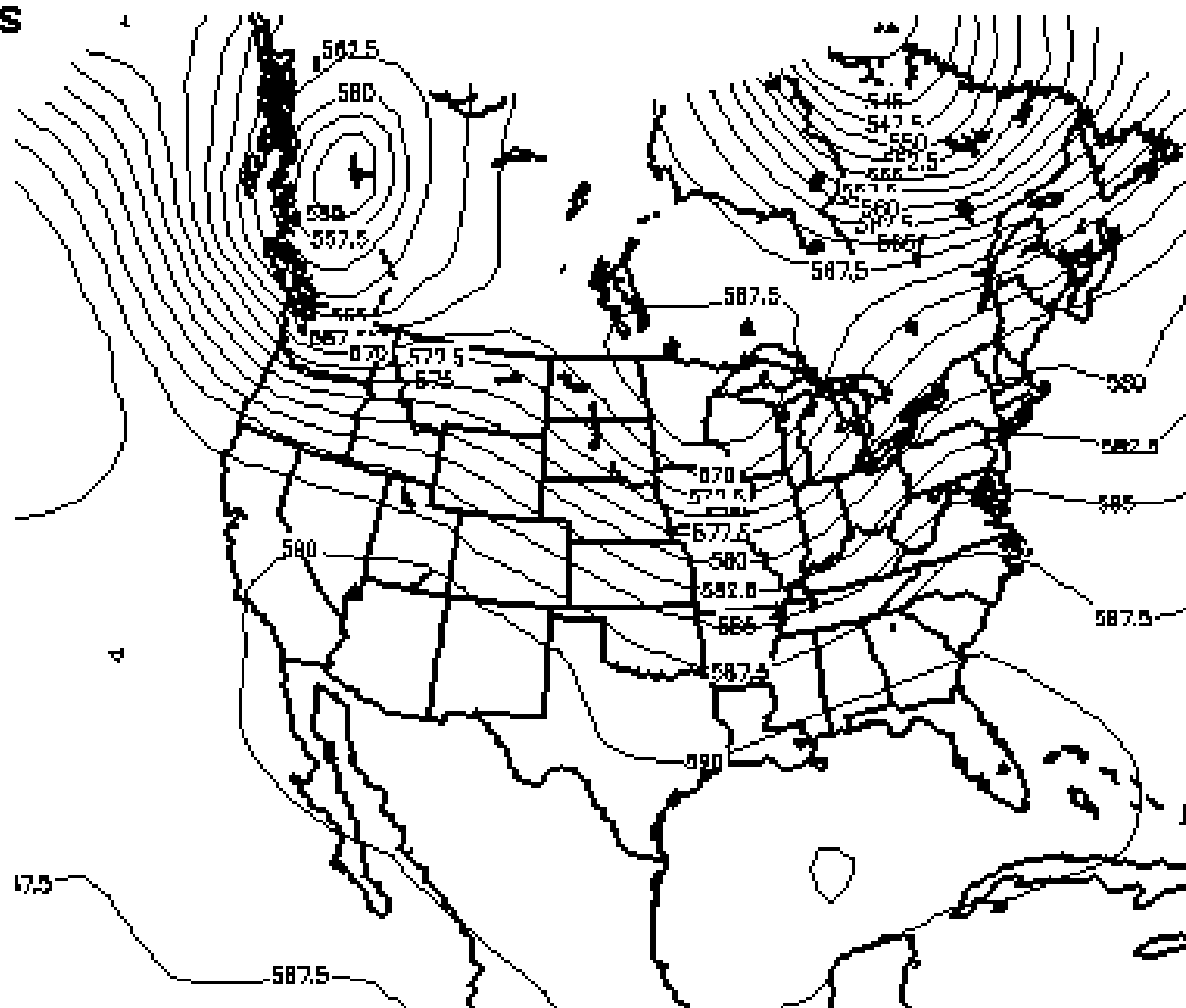


500mb GEOPOTENTIAL HEIGHTS (dam) 01-DAY MEAN FOR:
Thu JUL 01 2004

NCEP OPERATIONAL DATASET

500 mb Heights - STL

St Louis

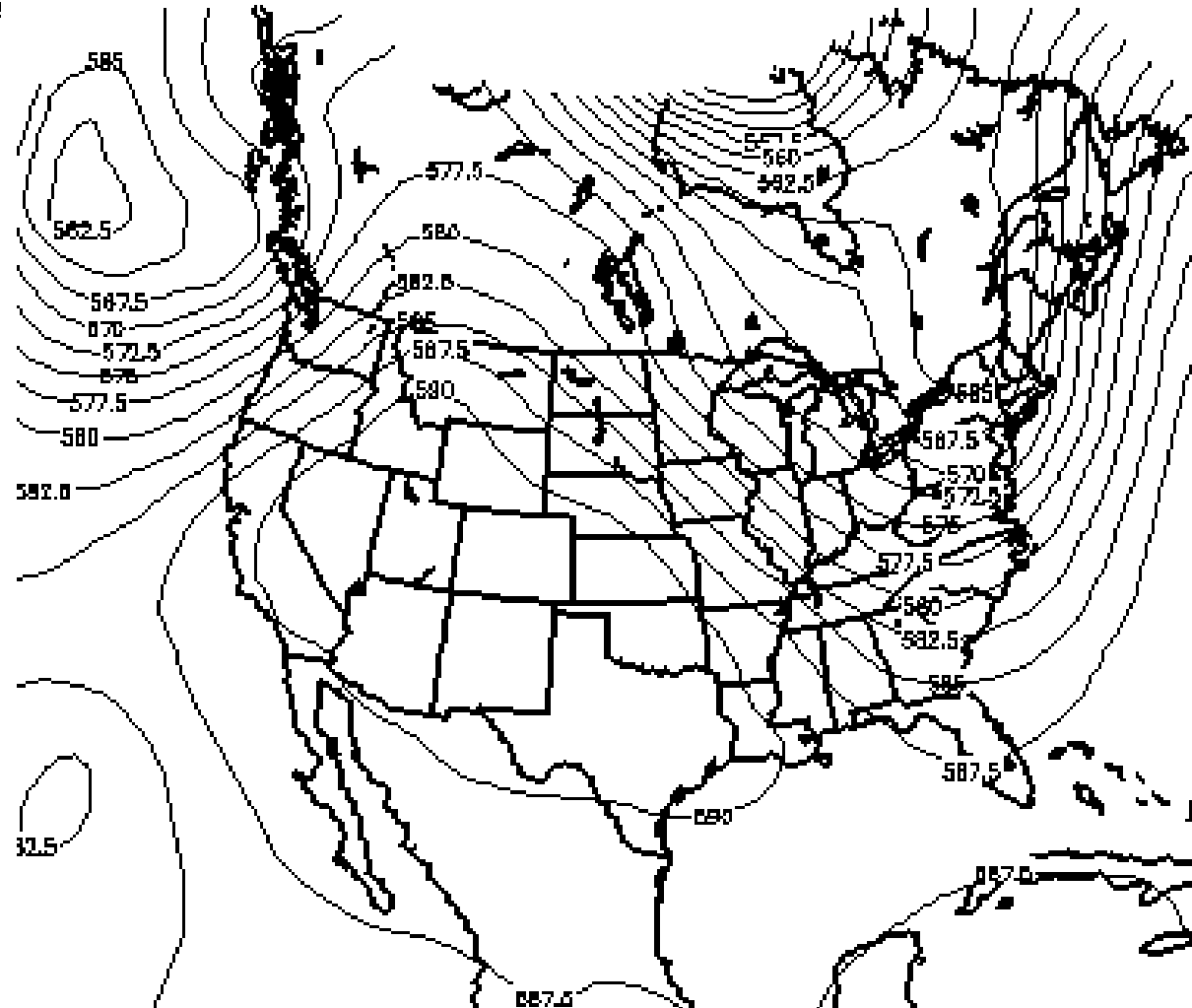


500mb GEOPOTENTIAL HEIGHTS (dam) 01-DAY MEAN FOR:
Wed JUL 07 2004

NCEP OPERATIONAL DATASET

500 mb Heights - NH

Pease

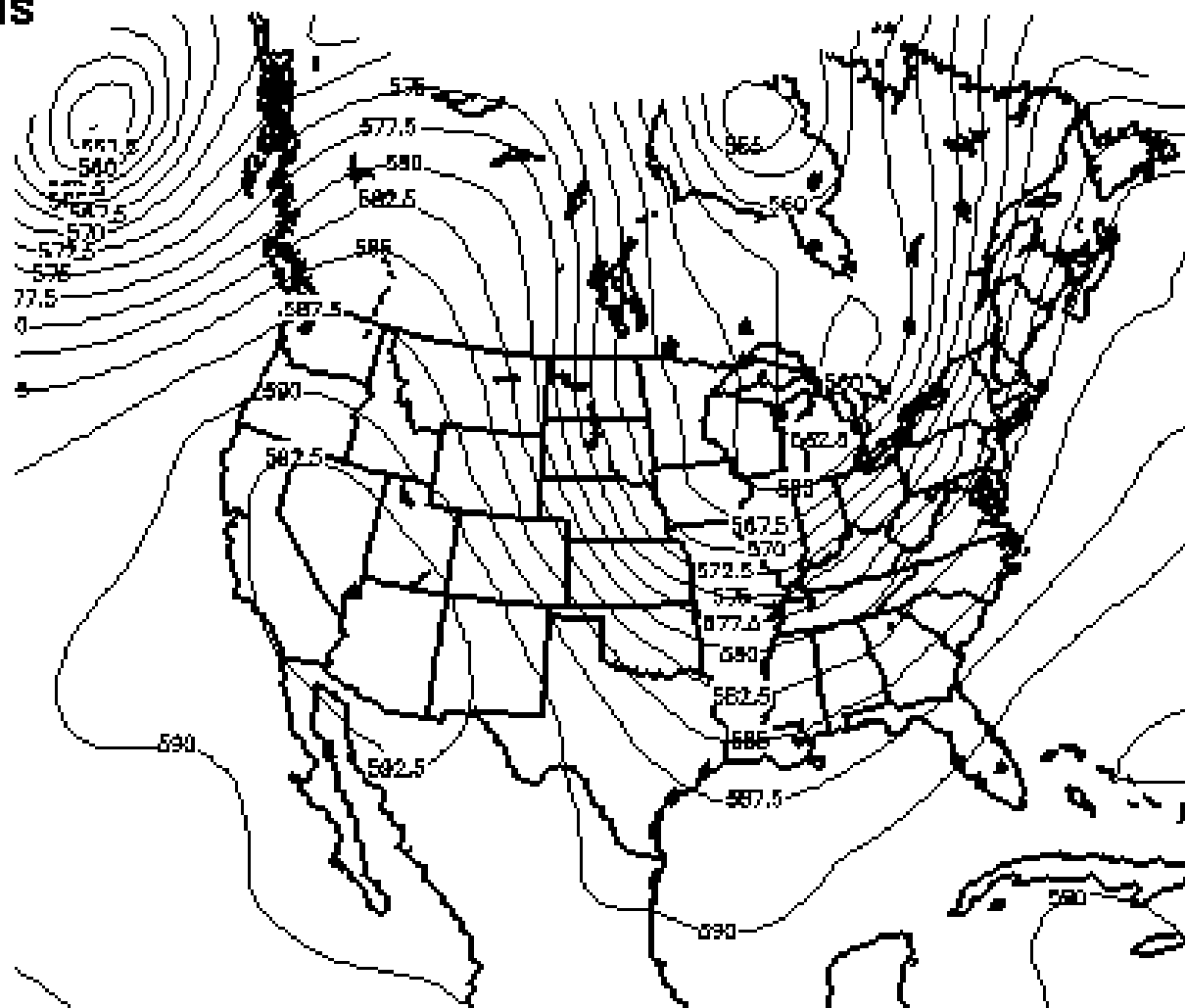


500mb GEOPOTENTIAL HEIGHTS (dam) 01-DAY MEAN FOR:
Fri JUL 16 2004

NCEP OPERATIONAL DATASET

500 mb Heights - STL

St Louis



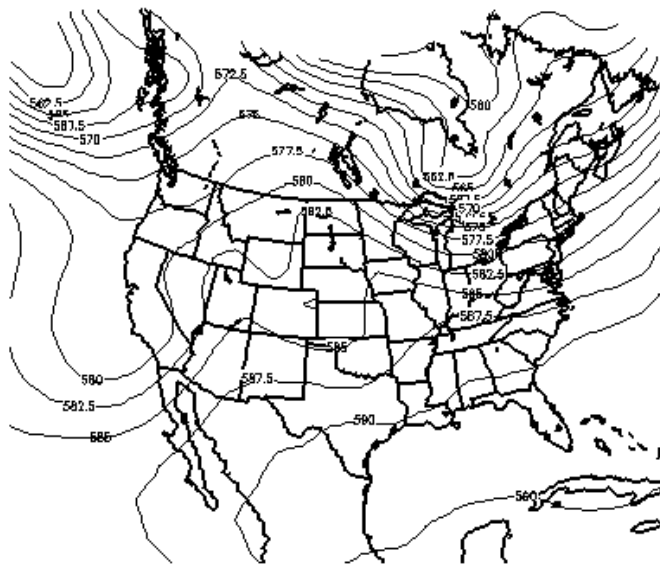
500mb GEOPOTENTIAL HEIGHTS (dam) 01-DAY MEAN FOR:
Thu AUG 12 2004

NCEP OPERATIONAL DATASET

2004 vs 2003 & 2002

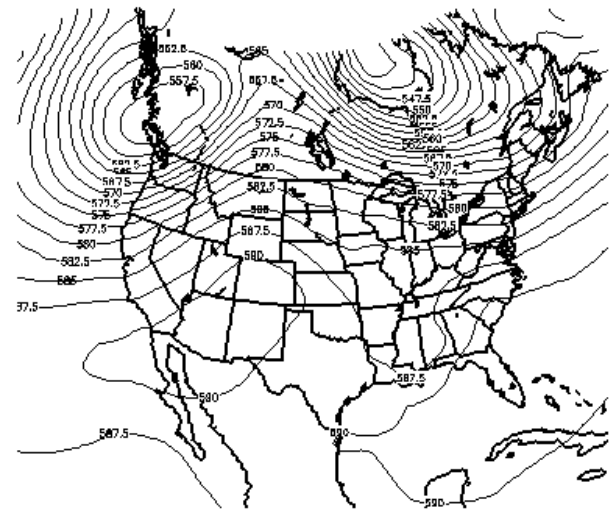
500 mb

2003

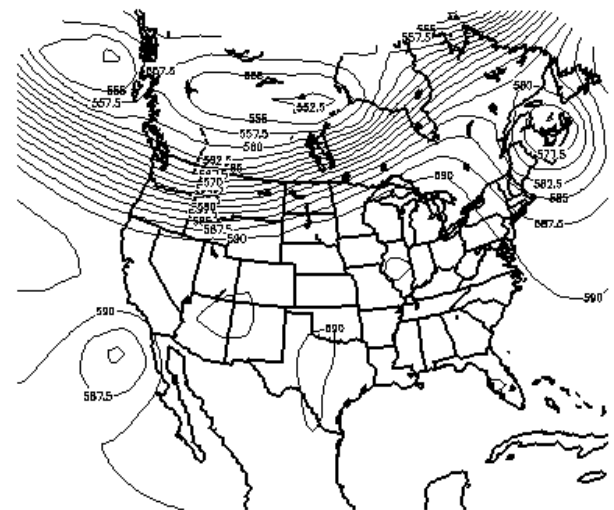


500mb GEOPOTENTIAL HEIGHTS (dam) 01-DAY MEAN FOR:
Thu JUL 01 2004
NCEP OPERATIONAL DATASET

2004



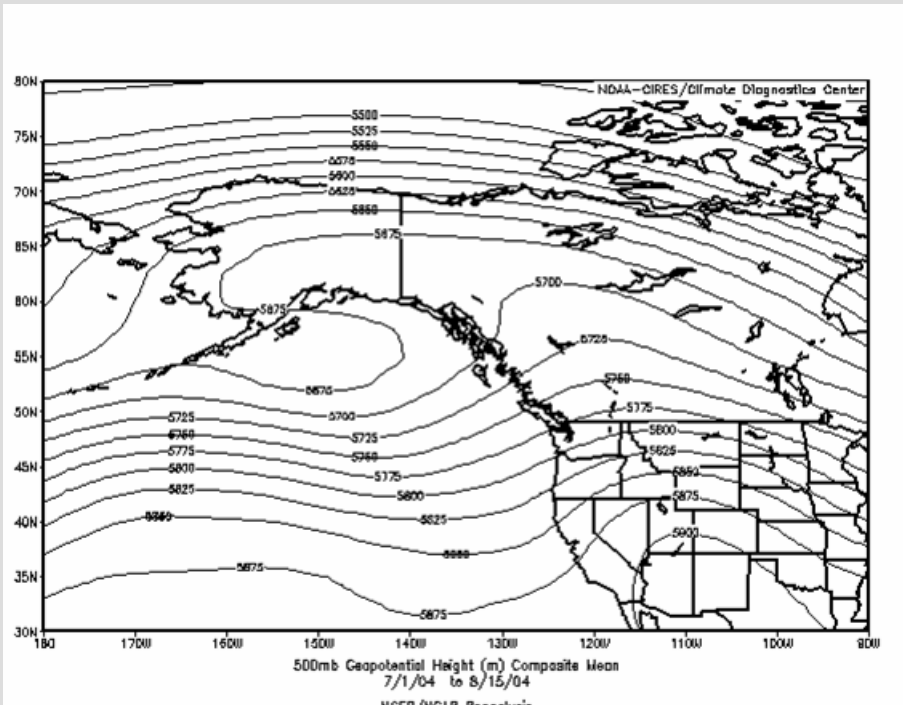
500mb GEOPOTENTIAL HEIGHTS (dam) 01-DAY MEAN FOR:
Tue JUL 01 2003
NCEP OPERATIONAL DATASET



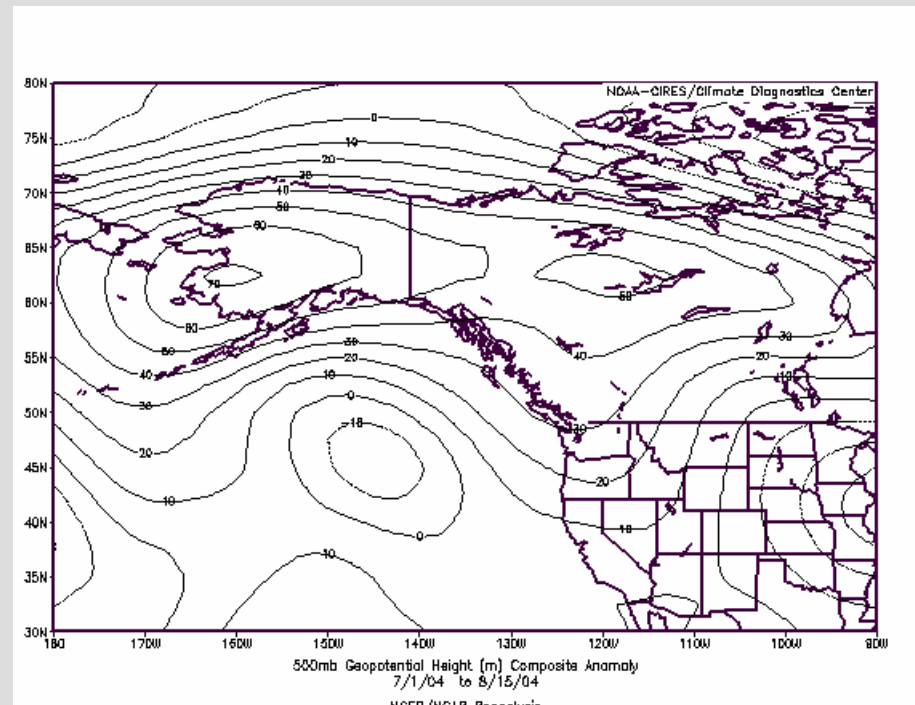
500mb GEOPOTENTIAL HEIGHTS (dam) 01-DAY MEAN FOR:
Mon JUL 01 2002
NCEP OPERATIONAL DATASET

2002

Strong Alaskan Ridge



Jul 1 – Aug 15 2004



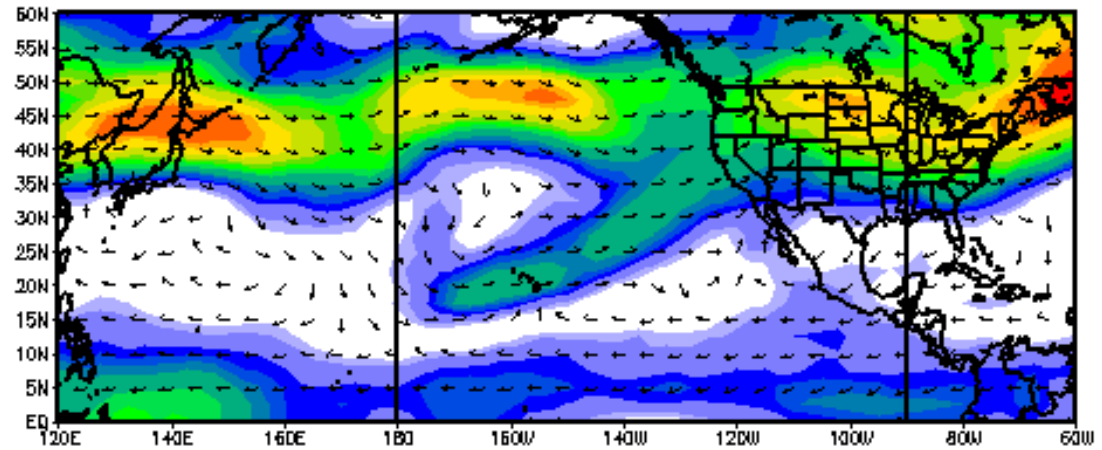
Anomaly



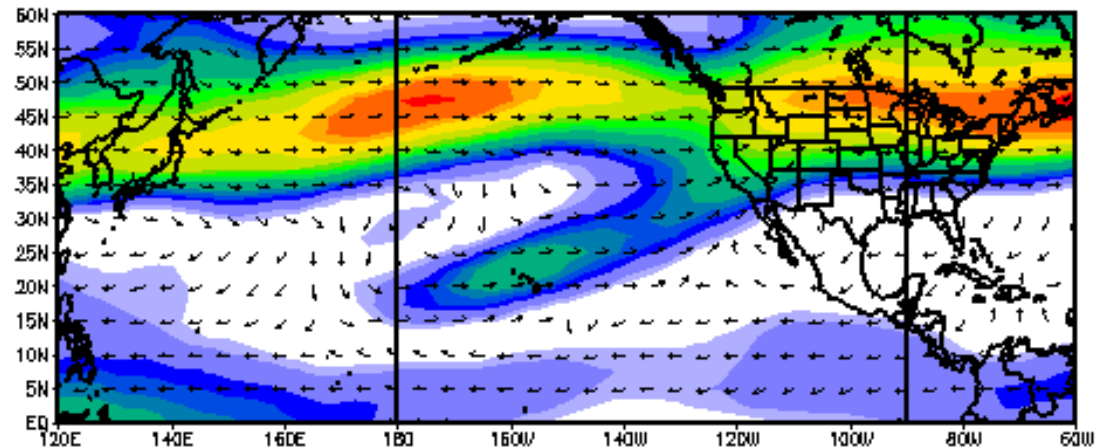
Dept. of Meteorology

300 mb Winds

**2004
46-day Mean**

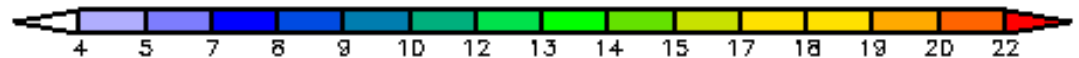


Climatology

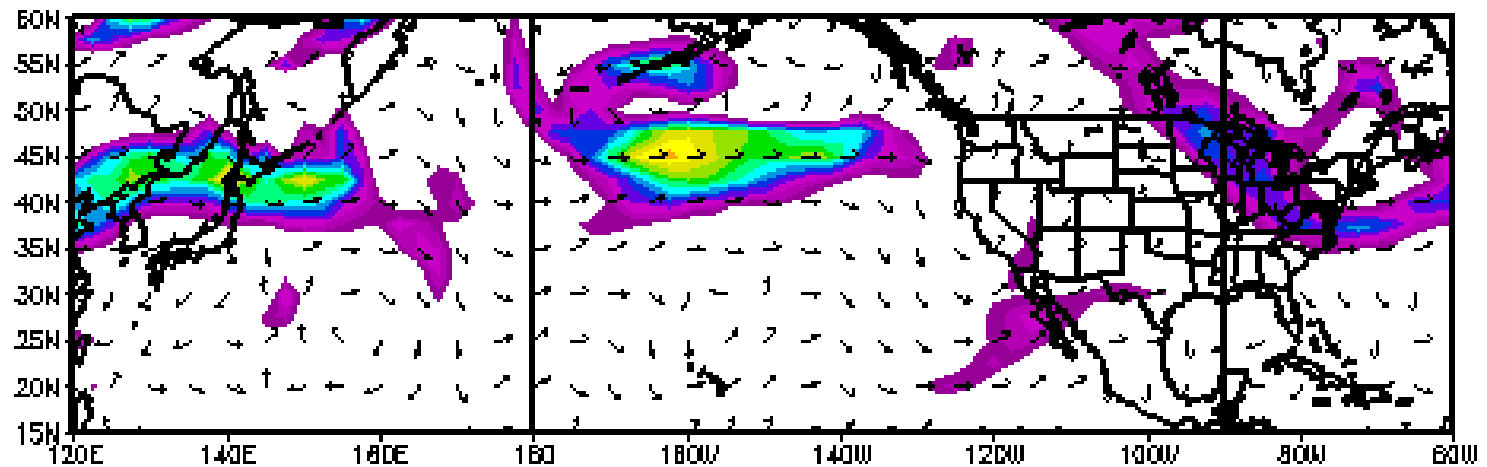


300mb WINDS (m/s) 46-DAY LONG TERM MEAN FOR:
JUL 01 - AUG 15

NCEP OPERATIONAL DATASET

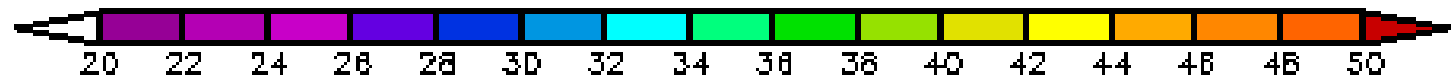


300 mb Winds - CA



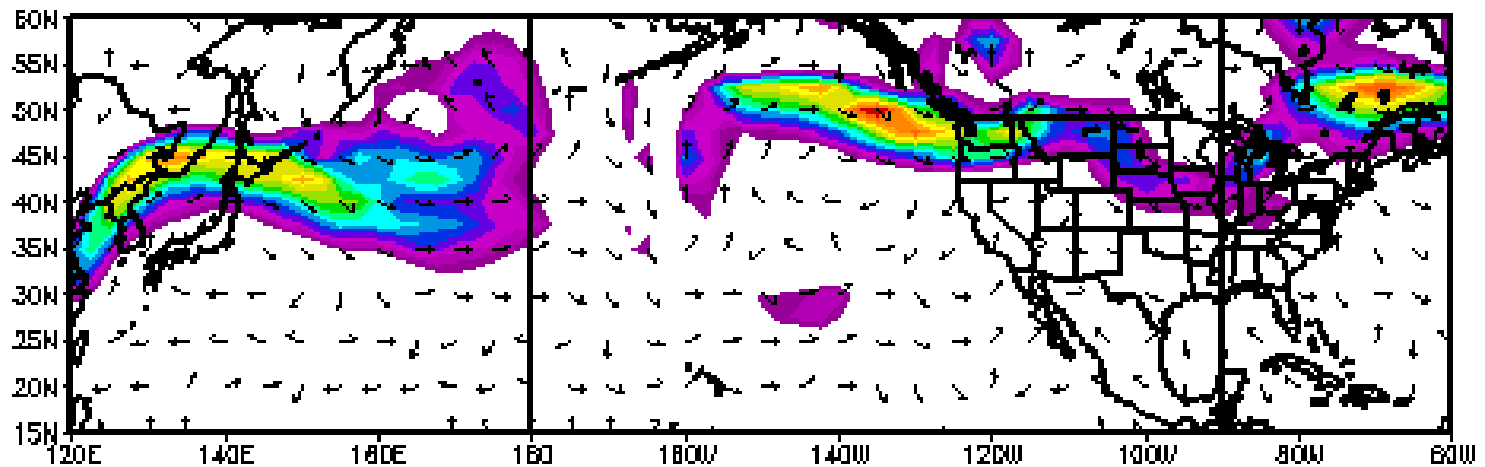
300mb WINDS (m/s) 01-DAY MEAN FOR:
Thu JUL 01 2004

NCEP OPERATIONAL DATASET



300 mb Winds - STL

St Louis



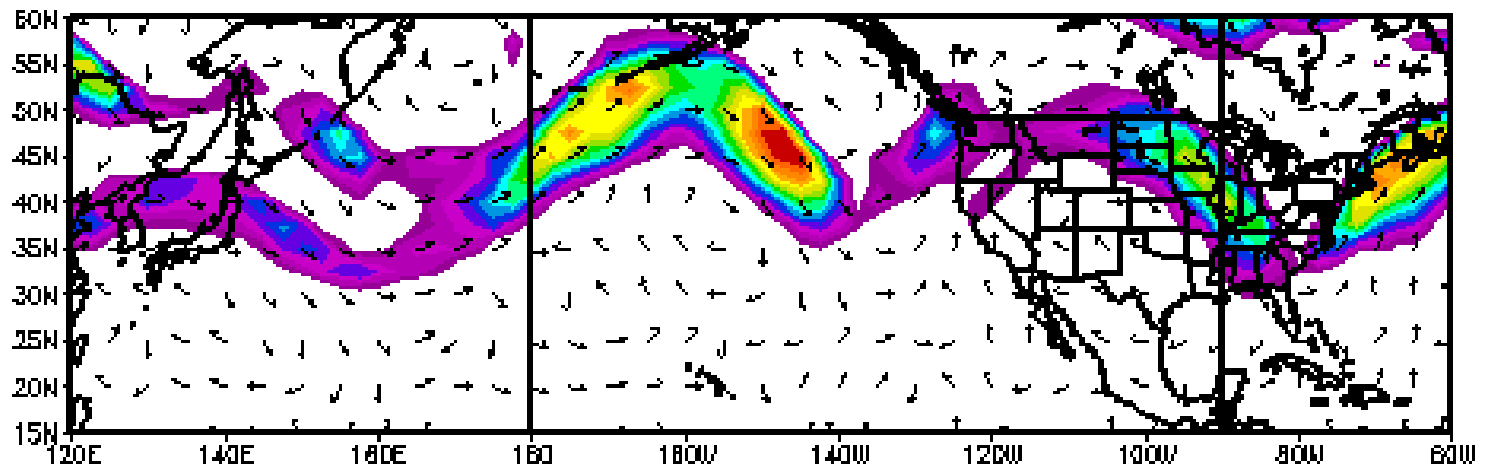
300mb WINDS (m/s) 01-DAY MEAN FOR:
Wed JUL 07 2004

NCEP OPERATIONAL DATASET



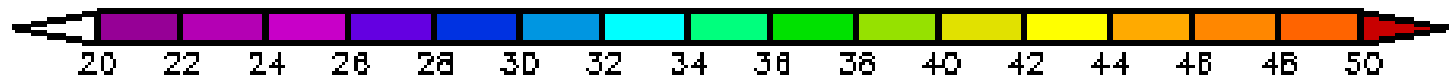
300 mb Winds - NH

Pease



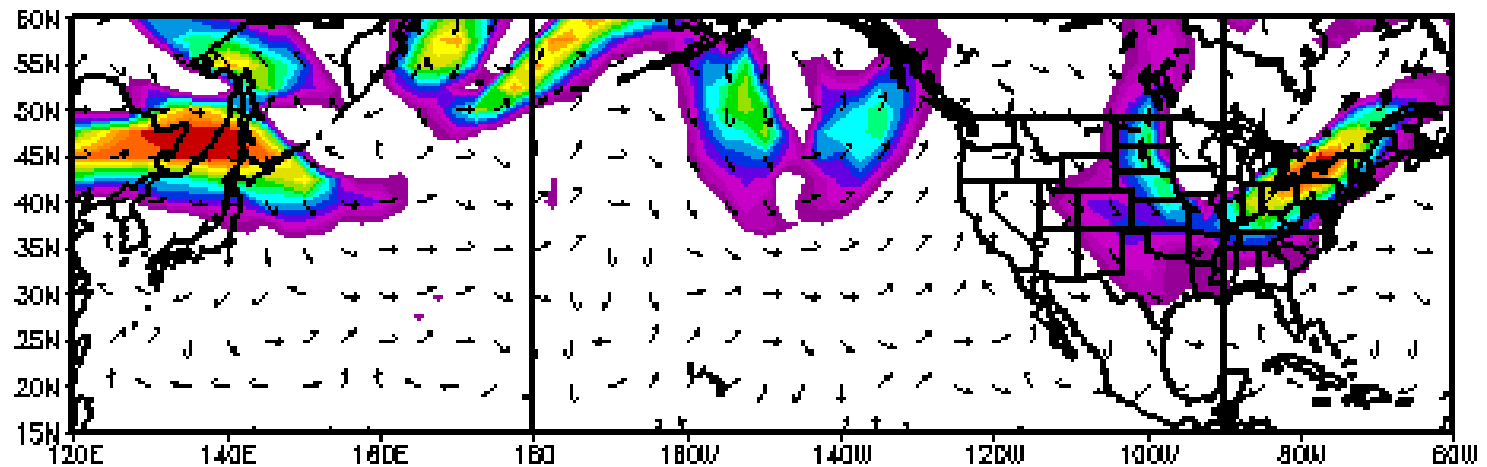
300mb WINDS (m/s) 01-DAY MEAN FOR:
Fri JUL 16 2004

NCEP OPERATIONAL DATASET



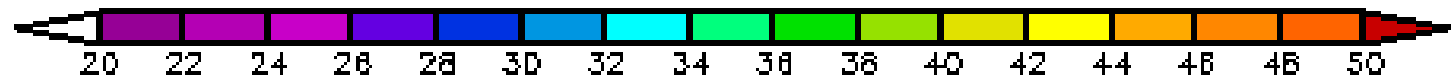
300 mb Winds - STL

St Louis



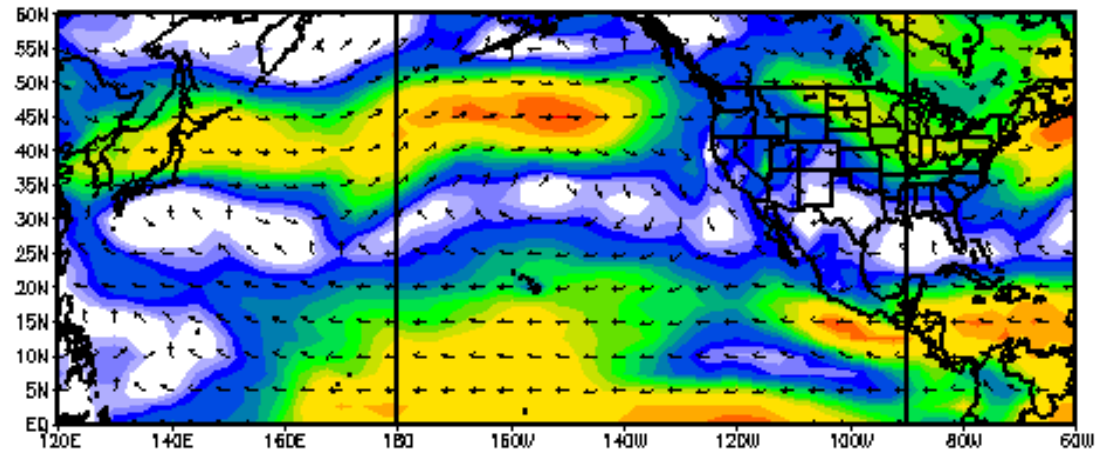
300mb WINDS (m/s) 01-DAY MEAN FOR:
Thu AUG 12 2004

NCEP OPERATIONAL DATASET

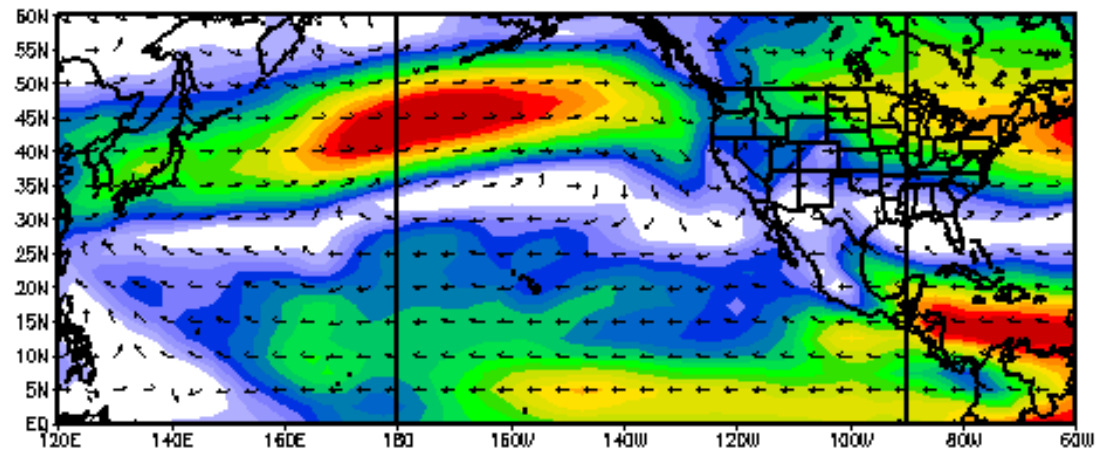


700 mb Winds

**2004
46-day Mean**



Climatology



700mb WINDS (m/s) 46-DAY LONG TERM MEAN FOR:
JUL 01 - AUG 15

NCEP OPERATIONAL DATASET

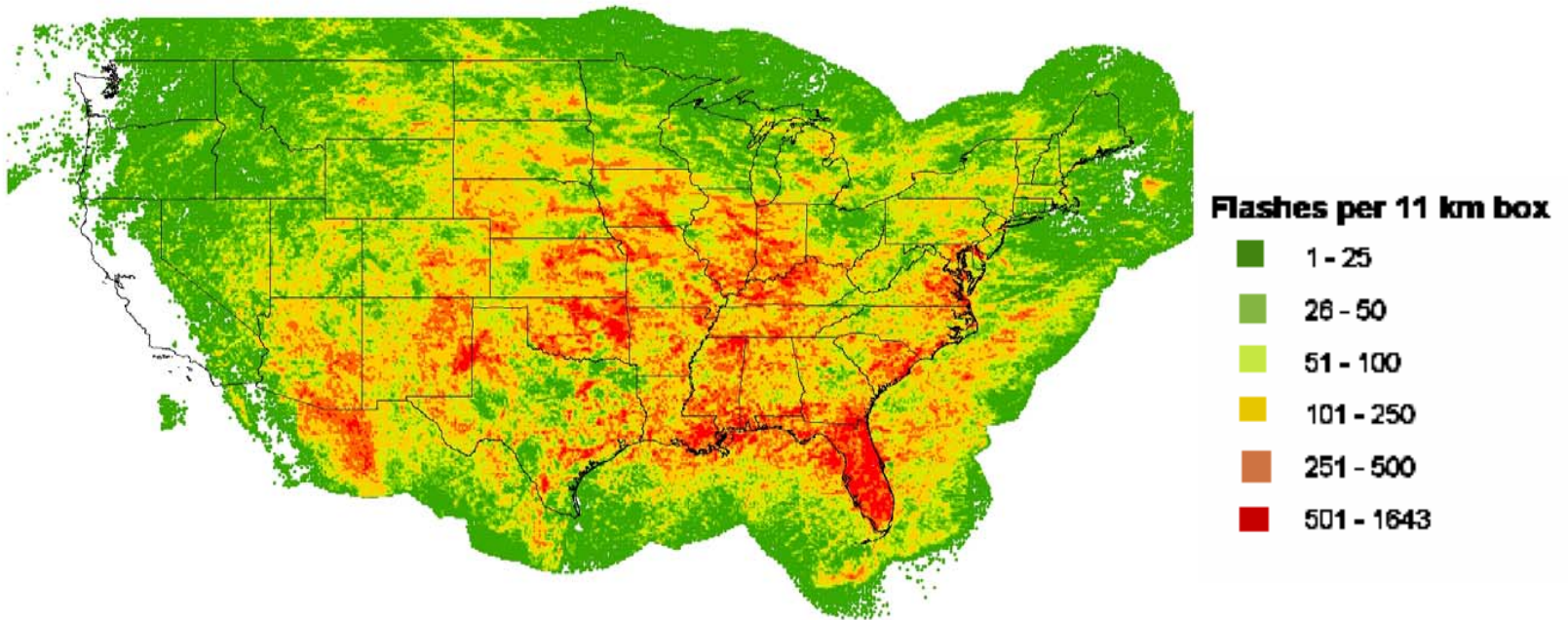


Case Studies

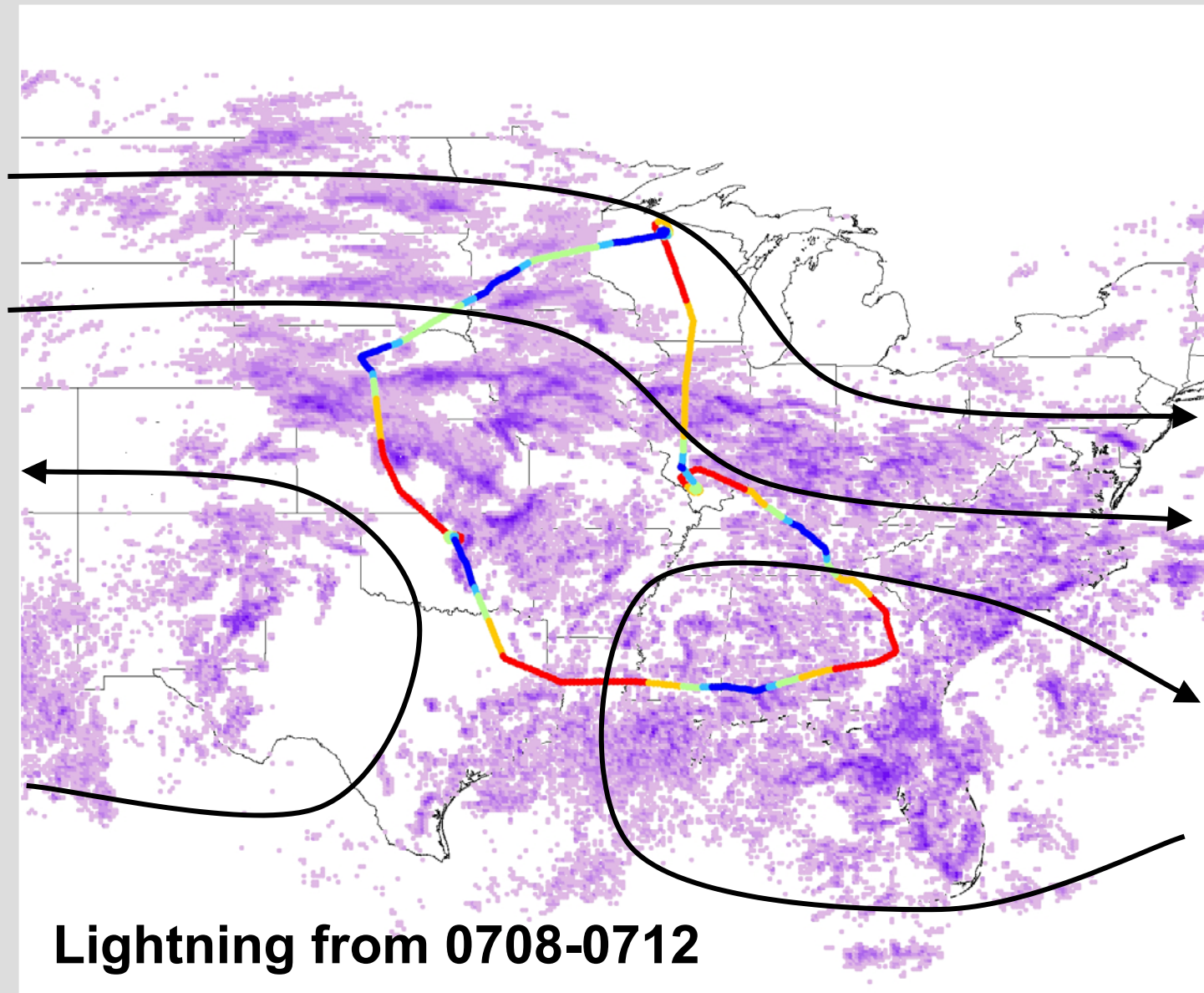
- Lightning
- Asian Pollution
- Alaskan Fires
- Flow to Europe (Lagrangian Experiments)



Lightning Composite Entire INTEX Period

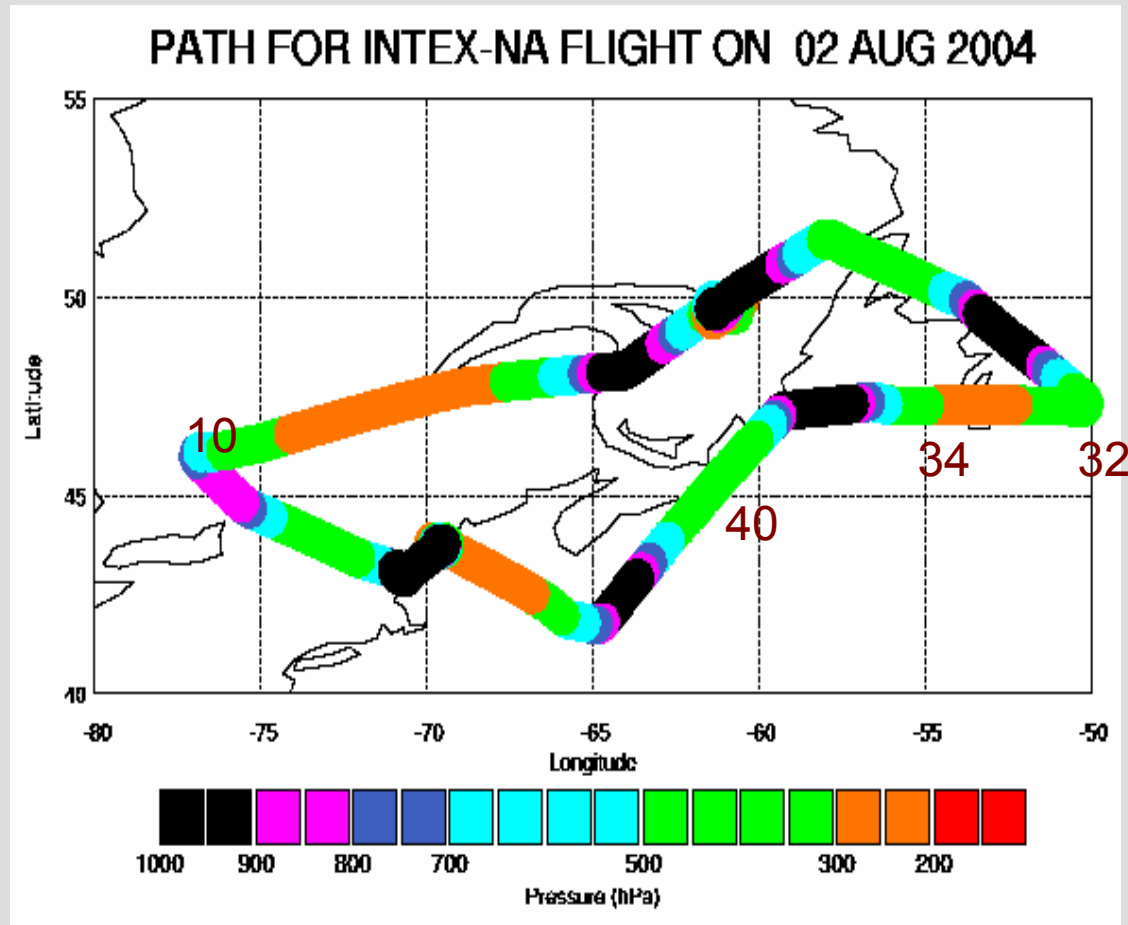


July 12 Flight



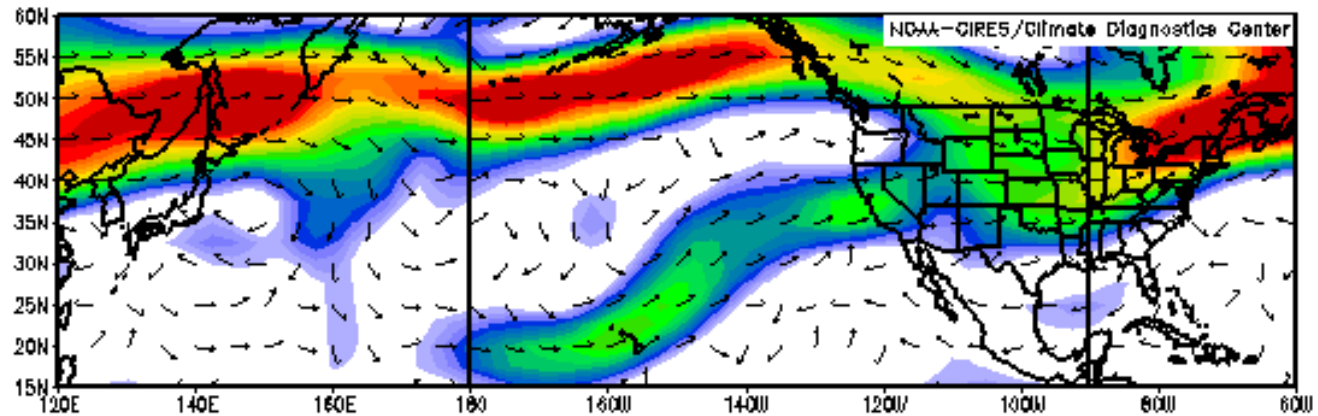
Asian Pollution – August 2

Note flight legs

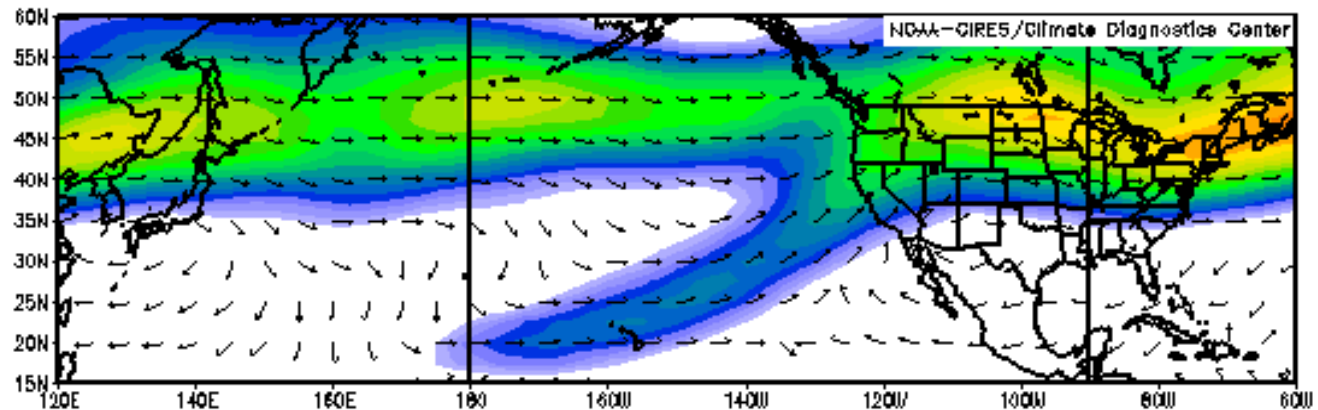


300 mb Winds July 24 – Aug. 2

2004



Climatology



300mb Vector Wind (m/s) Climatology 1968-1996 NCEP/NCAR Reanalysis
7/24 to 8/2

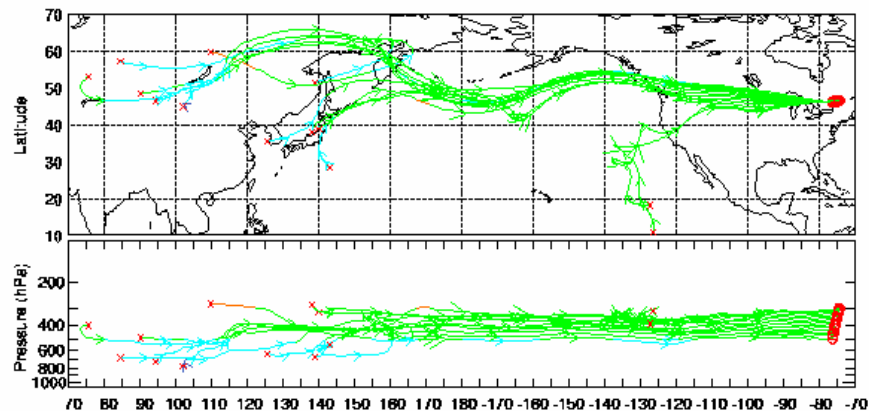
NCEP/NCAR Reanalysis



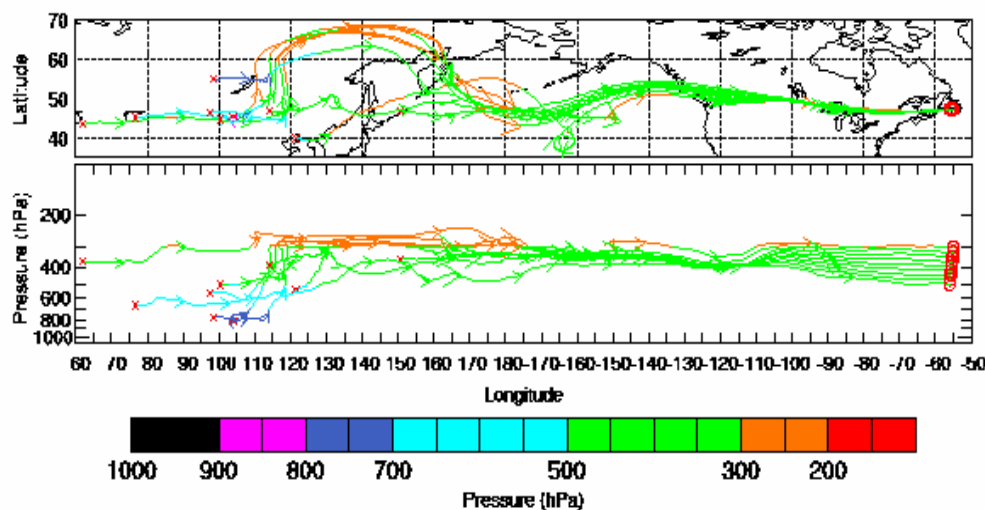
Back Trajectories from Aug. 2

INTEX-NA 1-MINUTE TRAJECTORIES - FSU METEOROLOGY

10 DAYS BACK FROM FLIGHT ON 02 AUG 2004
INITIATED AT FLIGHT LEVEL FOR FLIGHT LEG 10

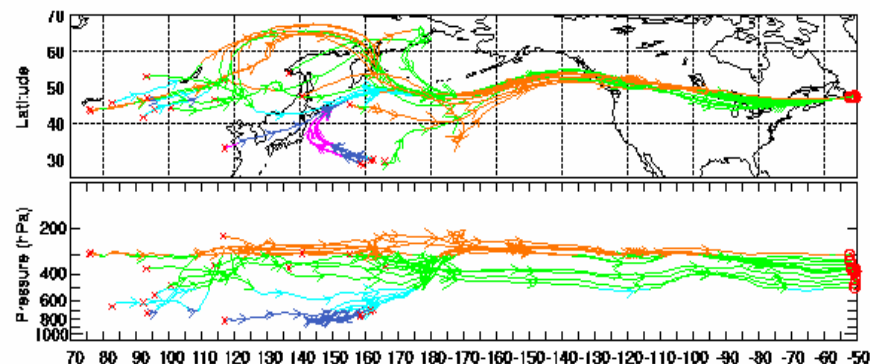


10 DAYS BACK FROM FLIGHT ON 02 AUG 2004
INITIATED AT FLIGHT LEVEL FOR FLIGHT LEG 34

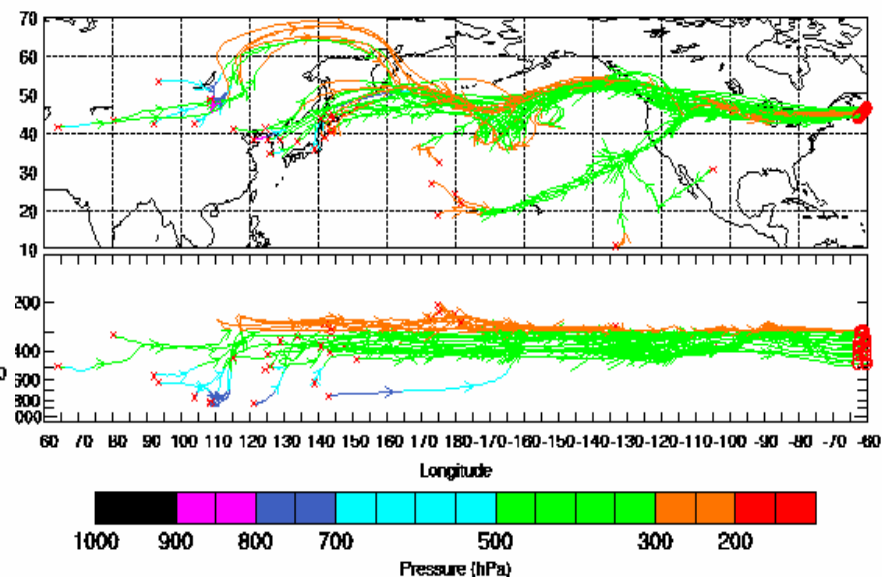


INTEX-NA 1-MINUTE TRAJECTORIES - FSU METEOROLOGY

10 DAYS BACK FROM FLIGHT ON 02 AUG 2004
INITIATED AT FLIGHT LEVEL FOR FLIGHT LEG 32

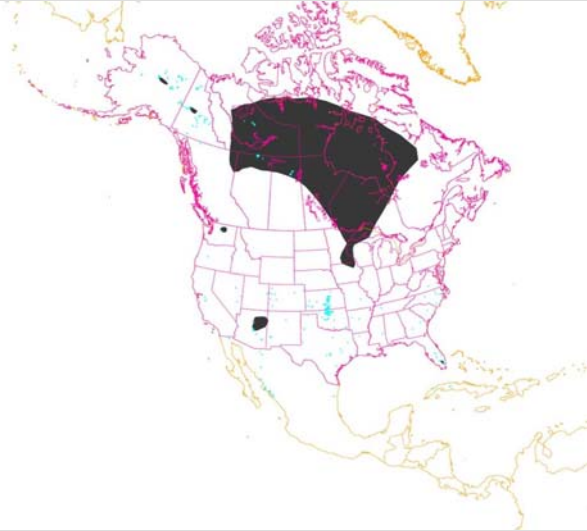


10 DAYS BACK FROM FLIGHT ON 02 AUG 2004
INITIATED AT FLIGHT LEVEL FOR FLIGHT LEG 40

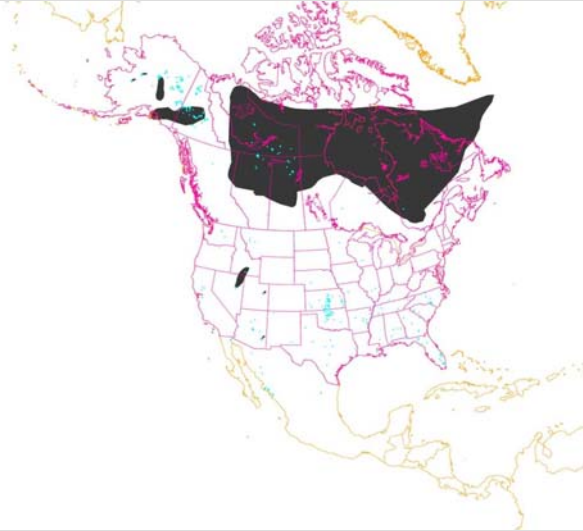


Alaskan Fires

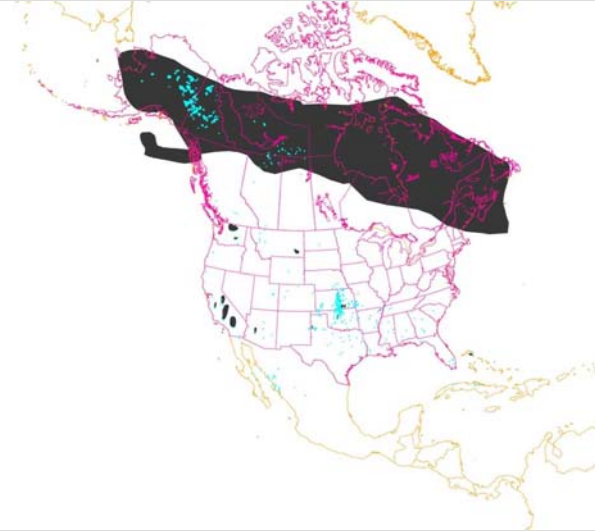
Jul 8



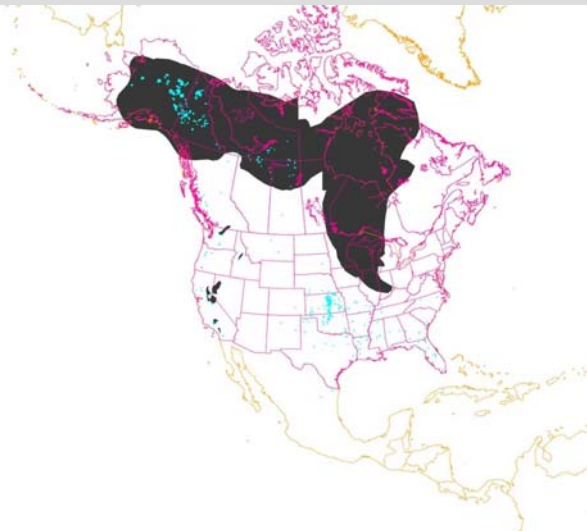
Jul 10



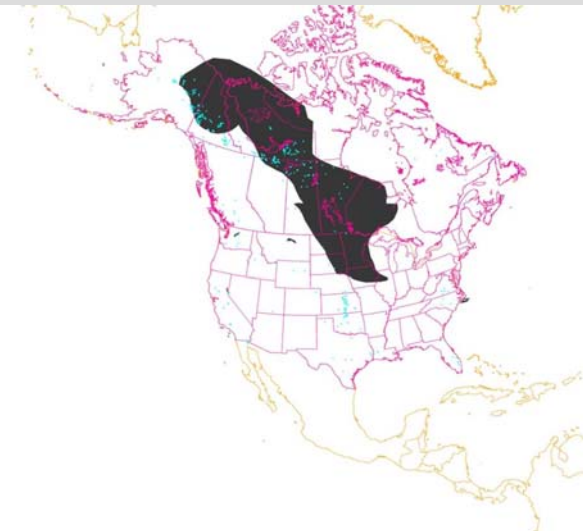
Jul 12



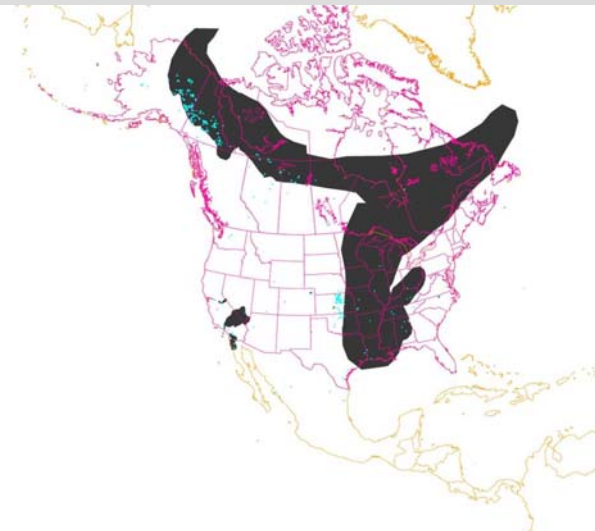
Jul 14



Jul 16

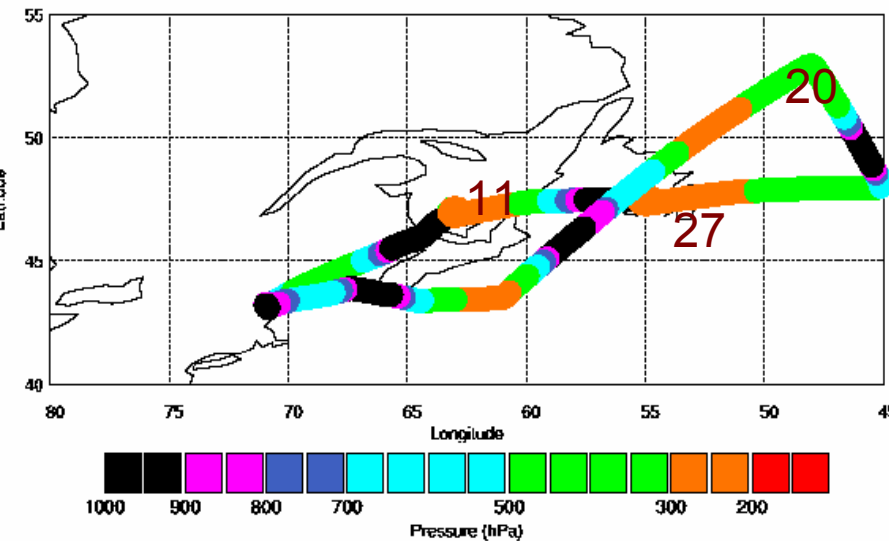


Jul 18—See next



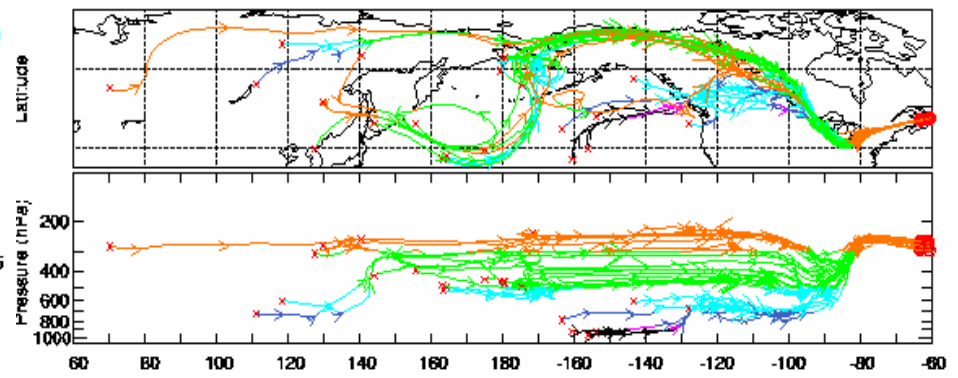
Alaskan Fires

PATH FOR INTEX-NA FLIGHT ON 18 JUL 2004

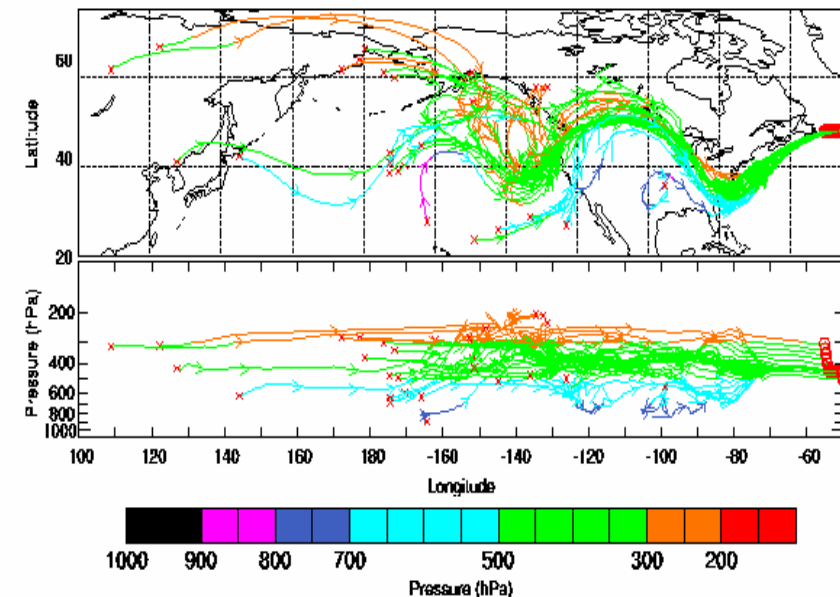


INTEX-NA 1-MINUTE TRAJECTORIES - FSU METEOROLOGY

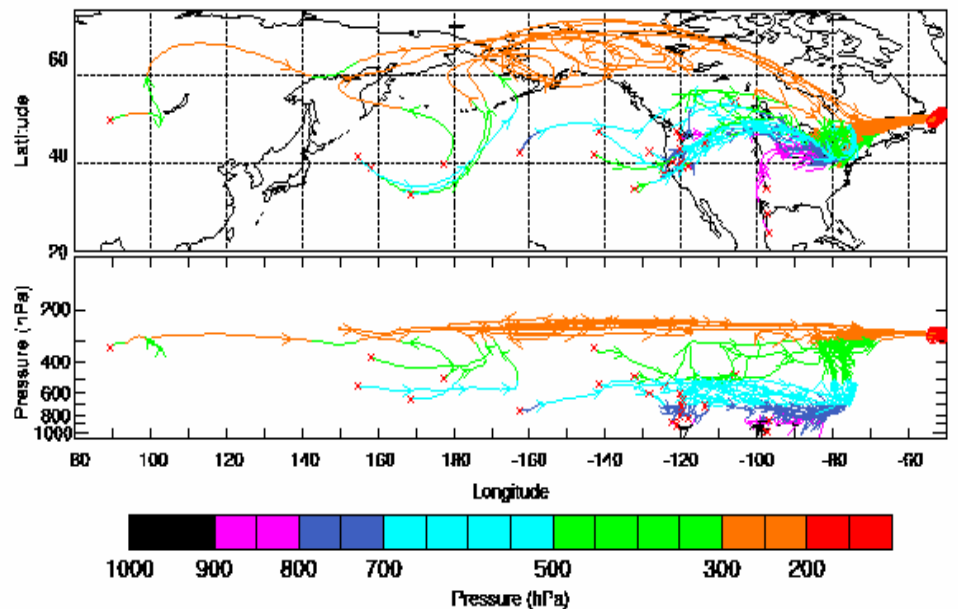
10 DAYS BACK FROM FLIGHT ON 18 JUL 2004
INITIATED AT FLIGHT LEVEL FOR FLIGHT LEG 11



10 DAYS BACK FROM FLIGHT ON 18 JUL 2004
INITIATED AT FLIGHT LEVEL FOR FLIGHT LEG 20

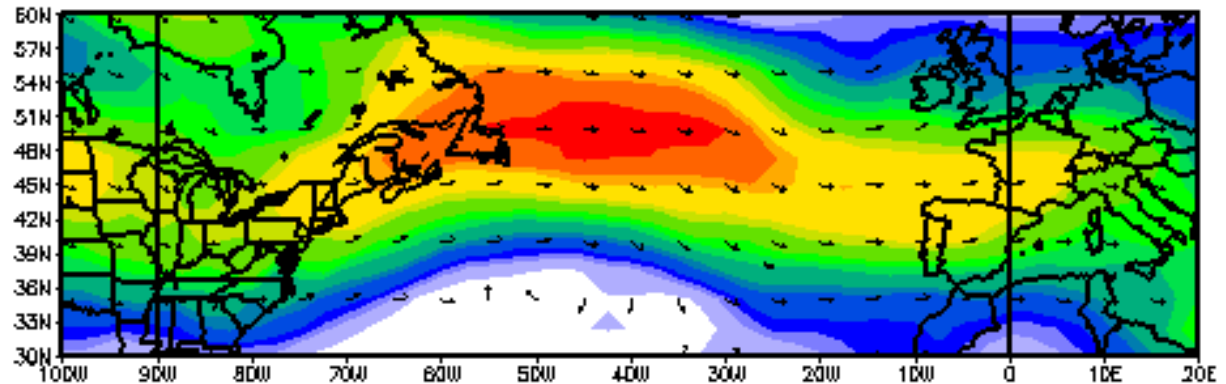


10 DAYS BACK FROM FLIGHT ON 18 JUL 2004
INITIATED AT FLIGHT LEVEL FOR FLIGHT LEG 27

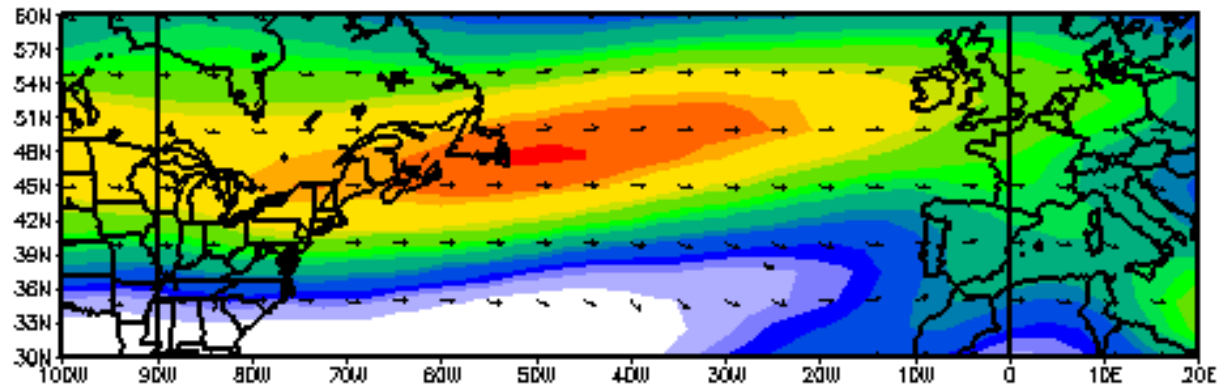


Lagrangian to Europe--300 mb Winds

**2004
46-day Mean**



Climatology



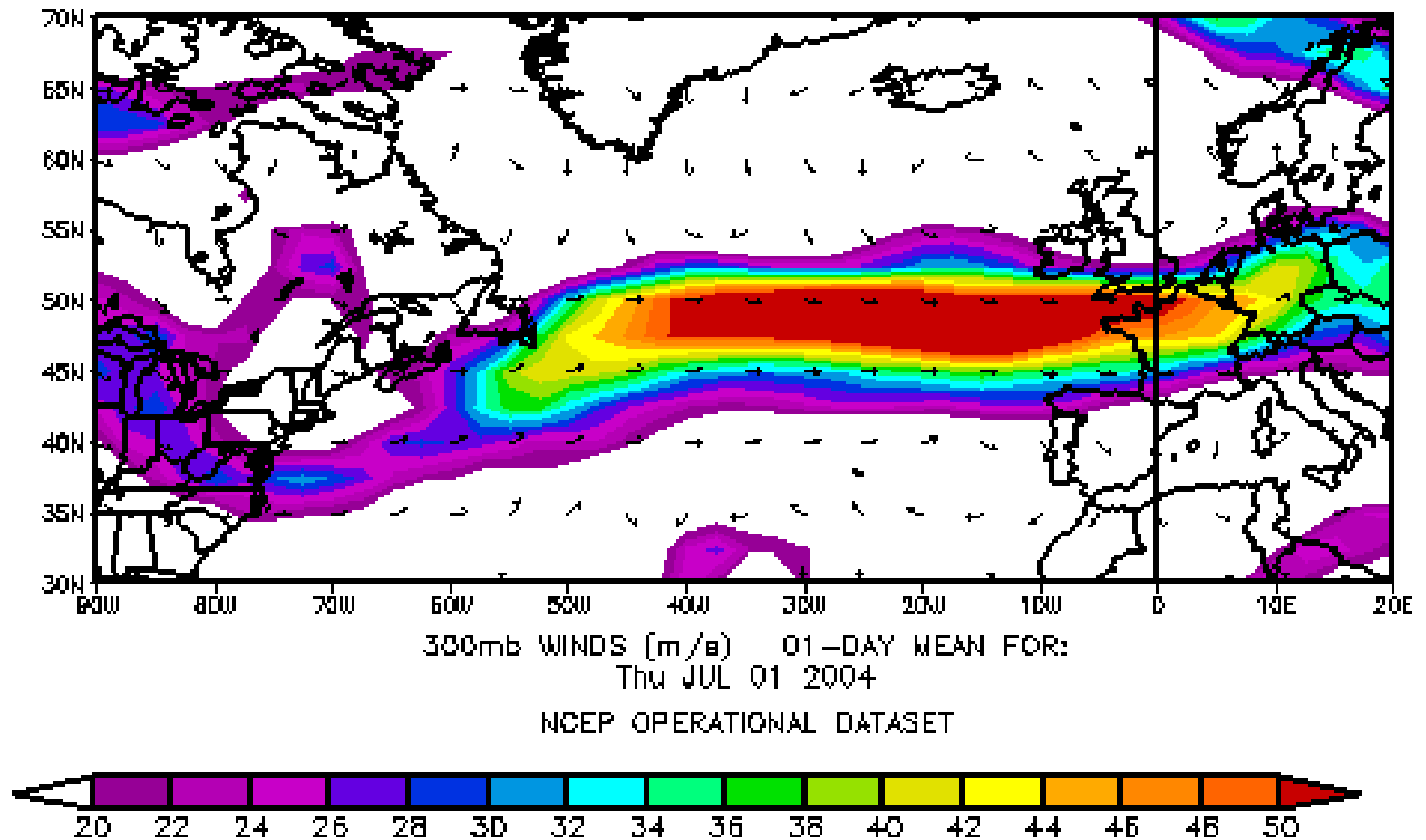
300mb WINDS (m/s) 46-DAY LONG TERM MEAN FOR:
JUL 01 - AUG 15

NCEP OPERATIONAL DATASET



Lagrangian to Europe

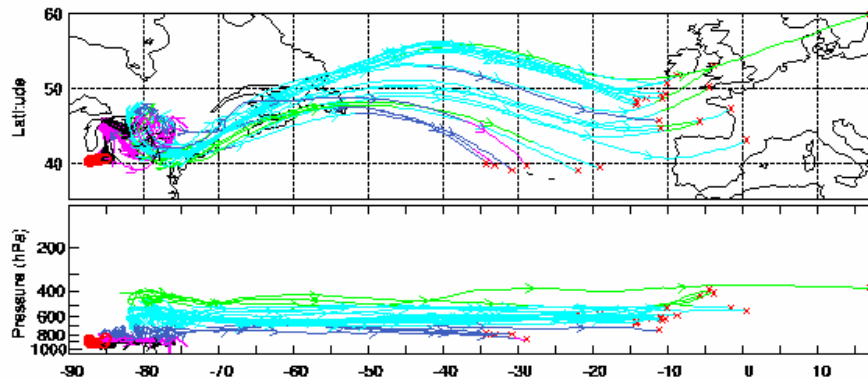
300 mb Winds



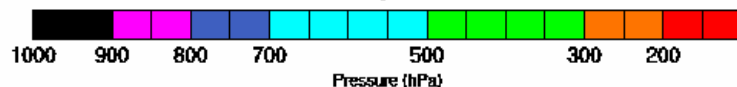
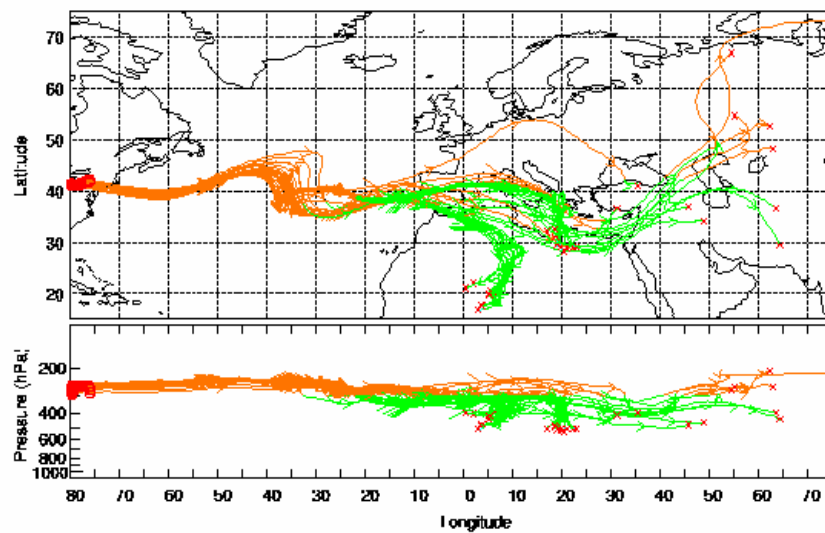
Lagrangian Case Forward Trajectories

INTEX-NA 1-MINUTE TRAJECTORIES - FSU METEOROLOGY

10 DAYS FORWARD FROM FLIGHT ON 10 JUL 2004
INITIATED AT FLIGHT LEVEL FOR FLIGHT LEG 5

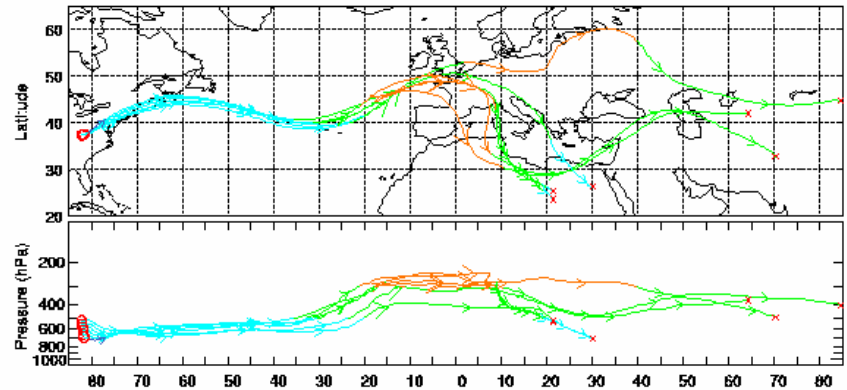


10 DAYS FORWARD FROM FLIGHT ON 10 JUL 2004
INITIATED AT FLIGHT LEVEL FOR FLIGHT LEG 13

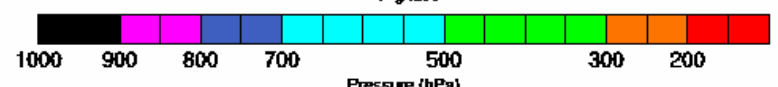
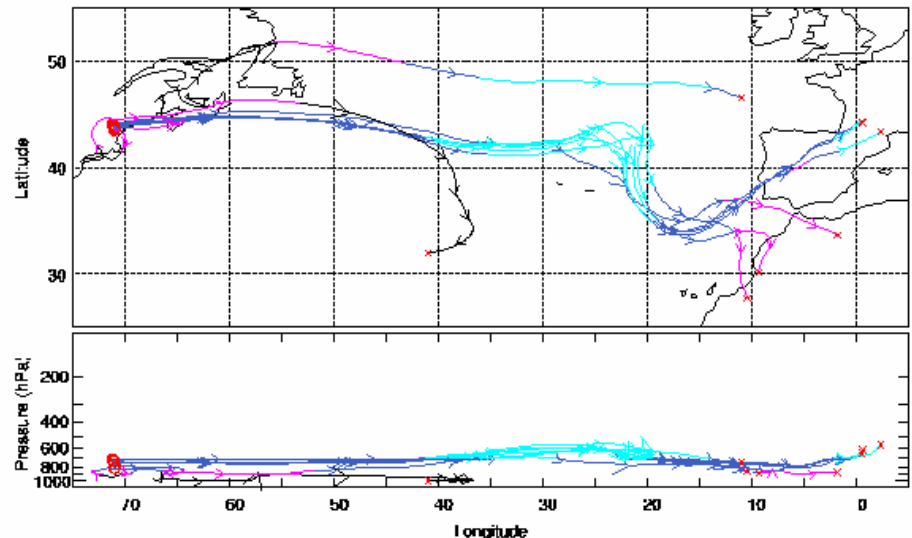


INTEX-NA 1-MINUTE TRAJECTORIES - FSU METEOROLOGY

10 DAYS FORWARD FROM FLIGHT ON 25 JUL 2004
INITIATED AT FLIGHT LEVEL FOR FLIGHT LEG 37

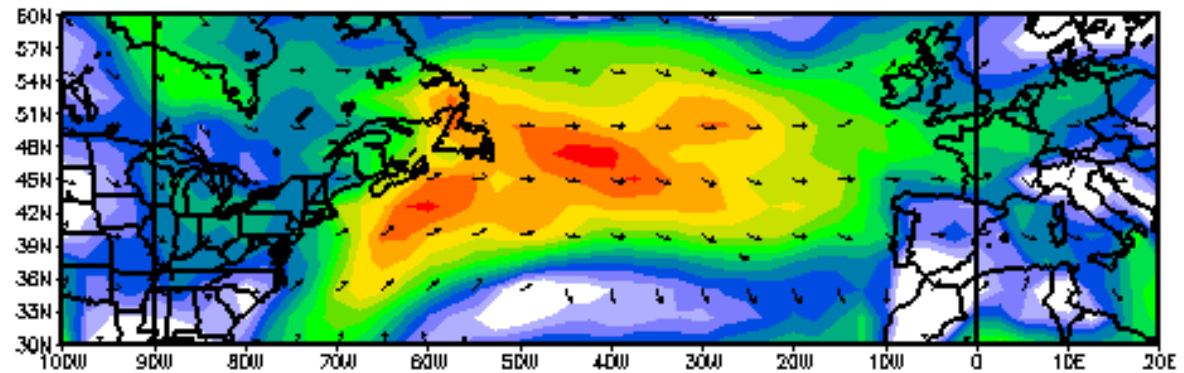


10 DAYS FORWARD FROM FLIGHT ON 25 JUL 2004
INITIATED AT FLIGHT LEVEL FOR FLIGHT LEG 50

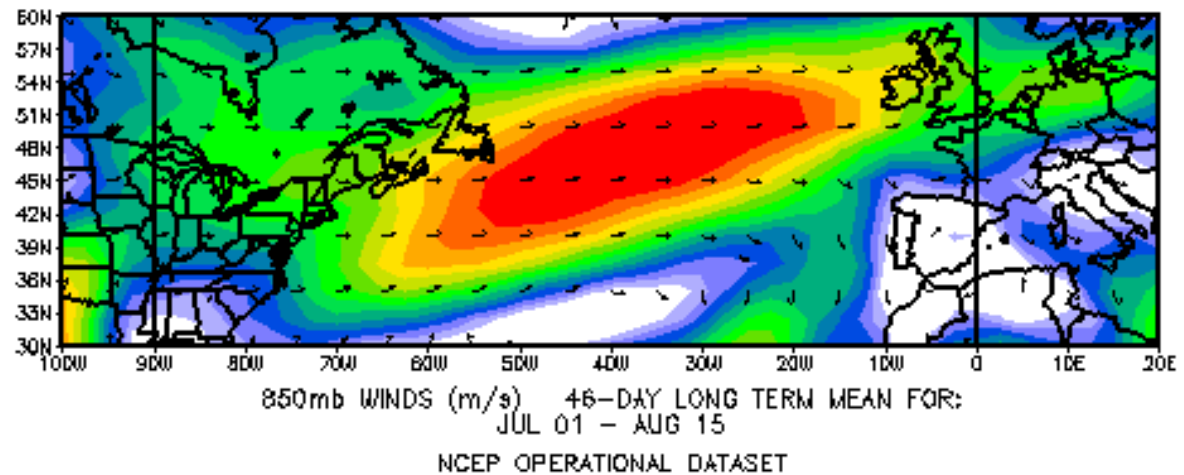


850 mb Winds

**2004
46-day Mean**



Climatology



Conclusions

- INTEx-A mostly representative of climatology
- But, a persistent trof along the East Coast
- Frontal passages on the “high” end of normal
- No stagnant high pressure centers over NE
- Hot and dry over Alaska → record fires
- TransPacific flow sometimes conducive to long range transport to central/eastern U.S.
- TransAtlantic sometimes conducive to European transport, but farther south than usual



Our Goal is to Assist You

Our web site contains met. data about each flight, e.g., trajectories, flow patterns, etc.

We are happy to help you apply meteorology to your own research

If we do not have the product you need, we will make it for you

Just let us know !!

